Historically Significant Waterpower Equipment Study Report

Lawrence Hydroelectric Project (FERC No. 2800)

April 2025

Prepared by:

HDR

Prepared for:

Essex Company, LLC
A subsidiary of Patriot Hydro, LLC

PATRIOT HYDRO

This page is intentionally left blank.

Contents

Tables

Figures

Appendices

List of Acronyms

APE	Area of Potential Effects
ca.	circa
CFR	Code of Federal Regulations
Essex	Essex Company, LLC
FERC	Federal Energy Regulatory Commission (or Commission)
FPA	Federal Power Act
HAER	Historic American Engineering Record
HDR	HDR Engineering, Inc.
ID	Identifier
ILP	Integrated Licensing Process
kV	kilovolt(s)
LHC	Lawrence Historical Commission
MACRIS	Massachusetts Cultural Resource Inventory system
MHC	Massachusetts Historical Commission
MW	megawatt(s)
NRHP	National Register of Historic Places
Project	Lawrence Hydroelectric Project (or Lawrence Project)
RSP	Revised Study Plan
SHPO	State Historic Preservation Office
SPD	Study Plan Determination
USC	United States Code

1 Introduction and Background

Essex Company, LLC (Essex), a subsidiary of Patriot Hydro, LLC, is the Licensee, owner, and operator of the Lawrence Hydroelectric Project (FERC No. 2800) (Project or Lawrence Project). The Project was licensed by the Federal Energy Regulatory Commission (FERC or Commission) on December 4, 1978 (with an effective date of December 1, 1978), and the license expires on November 30, 2028. The Lawrence Project is located on the Merrimack River in the city of Lawrence in Essex County, Massachusetts.

The Project is currently licensed by the Commission under the authority granted to FERC by Congress through the Federal Power Act (FPA), 16 United States Code (USC) §791(a), et seq., to license and oversee the construction and operation of non-federal hydroelectric projects on jurisdictional waters and/or federal lands. In accordance with FERC's regulations at 18 Code of Federal Regulations (CFR) §16.9(b), Essex must file an application for a new license for the Project on or before November 30, 2026. Accordingly, Essex is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 CFR Part 5 of the Commission's regulations. In accordance with 18 CFR §5.11 of the Commission's regulations, in April 2024 Essex filed a Revised Study Plan (RSP) with the Commission in support of relicensing the Project. The Commission issued their Study Plan Determination (SPD) in May of 2024. This report has been prepared in fulfillment of the Historically Significant Waterpower Equipment Study described in the RSP and SPD.

1.1 Project Description and Background

The Lawrence Project is located on the Merrimack River in the city of Lawrence, Massachusetts (Figure 1-1). The Project consists of:

- The 35-foot-high by 900-foot-long gravity Essex Dam of stone masonry construction (also known as the Great Stone Dam), with a 5-foot-high pneumatic crest gate system mounted on the spillway crest;
- A 9.8-mile-long impoundment having a surface area of 655 acres at a normal water elevation of 44.17 feet National Geodetic Vertical Datum of 1929 at the top of the crest gates, and gross storage capacity of approximately 19,900 acre-feet;
- A powerhouse located at the end of a small forebay adjacent to the southern abutment of the Essex Dam, containing two 8.4-megawatt (MW) generating units, and a tailrace channel extending into the Merrimack River channel;
- Fish passage facilities integral with the powerhouse, including a fish elevator and downstream fish bypass, and an eel ladder at the right (southern) abutment of the dam;
- The North Canal, approximately 5,300 feet long by 95 feet wide by 15 feet deep, originating at the northern abutment of the Essex Dam and paralleling the Merrimack River downstream of the dam;

- The South Canal, approximately 2,750 feet long by 35 feet wide by 10 feet deep, originating at the southern abutment of the Essex Dam and generally paralleling the Merrimack River downstream of the dam;
- A single-circuit, underground/underwater 23.0-kilovolt (kV) transmission line to the Massachusetts Electric Company's Lawrence No. 1 substation; and
- Appurtenant facilities.

The Commission's August 15, 2023, Scoping Document 1 and November 28, 2023 Scoping Document 2 identified various historical resource and cultural property issues to be analyzed in the Environmental Assessment for the Project's relicensing. The Commission requested the Historically Significant Waterpower Equipment Study; and Groundwork Lawrence, a stakeholder, requested an evaluation of historical Project works and their National Landmark eligibility. Additional stakeholders requested studies pertaining to historical resources, and informal comments were received from stakeholders.

The Lawrence Project is an operating hydroelectric project that requires routine maintenance. Essex maintains, repairs, and replaces mechanical and control equipment at the Project location on an as-needed basis. Additionally, Essex continuously evaluates the maintenance and operation of Project facilities to maximize operational efficiency and safety.

Several Project facilities are listed in the National Register of Historic Places (NRHP). Activities such as replacing mechanical equipment or controls or discontinuing maintenance of equipment that is no longer required for safe and efficient Project operations have the potential to affect historically significant waterpower equipment.

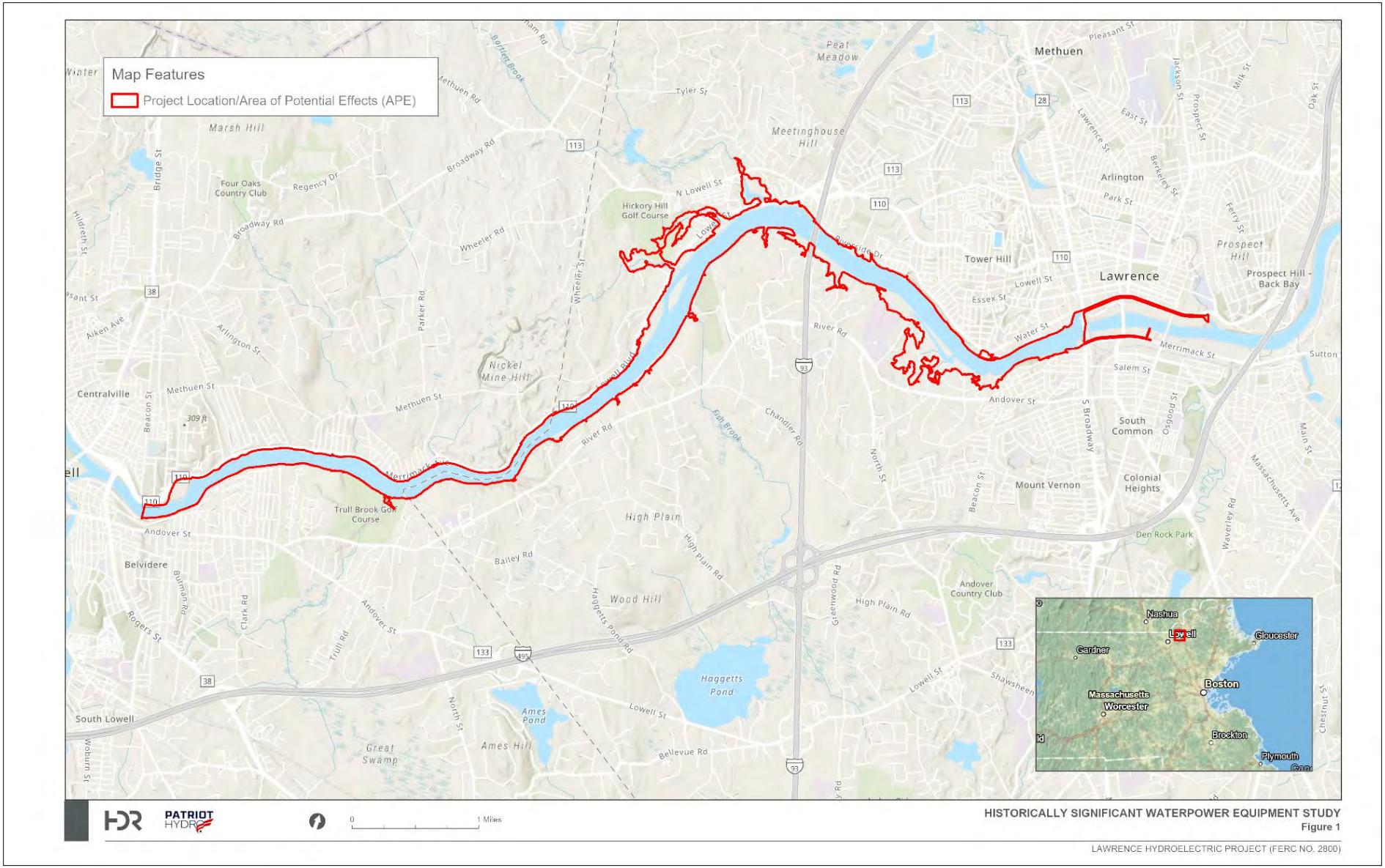


Figure 1-1. Lawrence Hydroelectric Project Area.

2 Study Goals and Objectives

The goal of the study is to identify and document historically significant waterpower equipment located within the canals and canal gatehouses, and identify the potential for future interpretation, exhibition, and preservation methods of identified resources, in consultation with the Massachusetts Historical Commission (MHC), which serves as the State Historic Preservation Office (SHPO); the Lawrence Historical Commission (LHC); and other interested parties.

The specific objectives of this study are:

- Consult with the Massachusetts SHPO, LHC, and other interested parties and conduct a site visit to identify historically significant waterpower equipment of interest to stakeholders for potential future interpretation, exhibition, or as a source of spare parts to maintain and operate other historical machinery;
- Photo-document historically significant waterpower equipment identified in consultation with the Massachusetts SHPO, LHC, and other interested parties;
- Conduct background research on the history of identified waterpower equipment, including designer/engineer, dates of manufacture and use, and an explanation of how the equipment was or is used; and
- Document current ownership of historically significant waterpower equipment.

3 Study Area

The study area includes the Project's canal system and civil works within the Project Boundary. Certain canal-related facilities, including the Great Stone Dam (NRHP 77000184), the North Canal (NRHP 75000278), and the North Canal Locks and Wasteway are listed in the NRHP and are contributing elements to the NRHP-listed North Canal Historic District (NRHP 09000280 and 84000417). Additionally, the South Canal, the South Canal Gatehouse, and the gatehouse's sluice gates have been recommended NRHP eligible.

4 Methodology

4.1 Consultation and Site Visit

On July 16, 2024, HDR Engineering, Inc. (HDR), on behalf of Essex, sent letters by mail initiating consultation with the Massachusetts SHPO per 36 CFR §800.3, and requesting concurrence on the appropriateness of an Area of Potential Effects (APE) consisting of the FERC Project Boundary in accordance with 36 CFR §800.4(a)(1). Essex also invited the Massachusetts SHPO to attend a field assessment scheduled for October 21, 2024. SHPO concurred on November 4, 2024 but did not elect to attend the site visit.

On July 16, 2024, HDR similarly contacted, via letters by mail, the LHC regarding the APE and an invitation to attend the October 2024 site visit. Follow-up emails were sent to the LHC and partners (the Lawrence History Center, the City of Lawrence Planning Department, and Groundwork Lawrence) on July 23, August 12, and September 24, 2024; however, no responses were received.

A site visit conducted by HDR on behalf of Essex was held at the Project location on October 22 and 23, 2024, to identify and survey historic-age waterpower equipment associated with the Lawrence Project. The survey included the Great Stone Dam, North Canal Gatehouse, North Canal, North Canal Wasteway, South Canal Gatehouse, South Canal, and the lower impoundment.

For purposes of this investigation, the historic period includes waterpower resources that meet the 50-year threshold of NRHP eligibility based on the planned 2026 license filing (i.e., constructed in 1976 or earlier).

4.2 Documentary Research

HDR, on behalf of Essex, researched available documents to identifyfiar the component elements of the canal systems and the equipment used to operate water control devices throughout the FERC boundary. The research effort also included development of a chronology of alterations to individual components of the system.

HDR researched, documented, and summarized relevant information regarding the history of the Lawrence canal system's waterpower equipment and structures. This included review of the Lawrence History Center's Essex Company Collection, Barry Flynn Essex Company Collection, and the Lawrence History Scrapbook Collection. Additional avenues of investigation included onsite research at the Lawrence Public Library, interviews with current Essex employees, and available documentation from the MHC available through the Massachusetts Cultural Resource Information System (MACRIS).

4.3 Photo-Documentation

During the October 22 and 23, 2024 survey, HDR photographed Project-related waterpower equipment and facilities, including the Great Stone Dam, North Canal, North Canal Gatehouse and Wasteway, South Canal, South Canal Gatehouse, and the lower impoundment. The survey also included photography of the former North Canal locks and various penstock gates along both canals. Photo-documentation depended on the nature, accessibility, and type of equipment or facility viewable from the public right-of-way.

5 Historic Context

During the first half of the nineteenth century, New England emerged as the epicenter of large-scale industrial development in the United States, made possible by the area's exceptional capacity for waterpower. Factors shaping this development included a shift from overseas commerce to local manufacturing, coupled with Boston's commercial and financial strength that provided the means to organize highly complex planning and

construction projects (Hunter 1979:204–205). In 1814, a prototype, vertically integrated[1] model of textile mills was constructed along the Charles River in Waltham, Massachusetts, that combined waterpower generation, mechanized production, and domestic labor under the same management. The Waltham mill's success was limited, however, because the Charles River lacked sufficient power-generating capacity to expand. In 1822, this model was used approximately 25 miles north in the newly planned city of Lowell along the Merrimack River (Ford 2000).

The complexity of replicating the Waltham model in Lowell required civil and hydraulic engineers, evolving professions, to develop new techniques to meet the project's challenges. The Lowell system, which grew to a combined length of approximately 5 miles, harnessed the Merrimack River into millraces[2], which were larger than contemporary navigation channels, and penstocks[3] powering factory waterwheels, before returning the water to the river. The system required various dams, gates, and canals, all with dimensions, profiles, and slopes designed to maintain a balance between the variable river and the mill's power requirements. Engineers met these challenges with little to no guidance from past experience. Because no fabricators existed locally that could create the equipment as designed, the project required the development of new, state-of-the-art, fabricating facilities (Hunter 1979:204–207).

The Lowell system's success during the second quarter of the nineteenth century prompted developers to use the same vertically integrated waterpower model throughout New England and the rest of the United States. Similar projects were soon underway in Chicopee and Holyoke, Massachusetts; Nashua and Manchester, New Hampshire; and Saco and Lewiston, Maine. However, by the time the Lawrence (1845) and Holyoke (1848) projects were underway, changing conditions had rendered the Lowell model obsolete (Hay 1986:III–IV).

The Essex Company, a waterpower and land development enterprise led by Charles Storer Storrow, formed in 1845 and aspired to recreate Lowell's success at a new location along the Merrimack River. Essex designed the new town of Lawrence approximately 9 miles downstream of Lowell, laying out streets and using deed covenants to shape the new town's development. The company's primary infrastructure and means of development consisted of a dam, power canal, and machine shop. Again, development was vertically integrated—Essex sold the land, designed and constructed the mills, and fabricated the mills' internal waterpower and mill equipment. The Essex business plan consisted of contracting to build and equip mills along its canal for independent textile manufacturing corporations to use, then collecting yearly fees for waterpower delivery.

The industry standard waterpower measurement unit consisted of the "mill power", which replaced the conventional horsepower. The unit was defined as the amount of power

[1] Vertical integration is a strategy under which an entity/company controls/owns multiple stages in the production/development process. For example, a single company would not only own the land, but also control construction, financing, production, distribution, and/or other actions throughout the life of the project.

[2] A millrace is the channel carrying the water current that drives a mill wheel.

[3] A penstock is an enclosed pipe that delivers water to hydro turbines and sewerage systems. In the case of historical watermills, penstocks diverted the waters that drove the mills.

required to drive a completely integrated cotton mill of the kind pioneered in Waltham and was equivalent to approximately 68 horsepower. Mill owners typically purchased sufficient mill powers to run their existing mills, plus additional mill powers in reserve for future expansion. For comparison, the Lowell project had a rated capacity of 140 mill powers, with Lawrence rated at 155. Waterpower rents at Lawrence averaged $1.00 per day per mill power, with a sliding scale for any additional delivered power overages (Hay 1986:446; Hunter 1979:210–211).

The Essex Company hoped to build upon two decades of the Lowell model's research, technology, and human resources, but from its outset, the project had underused facilities, slow development, and large, but unprofitable, fixed investments that made business plan execution challenging. During the approximately 35-year period between 1845 and the early 1880s, Essex employed various reorganization schemes, divestitures, stock swaps, and capital improvements to keep itself afloat. Also during this period, Essex endured the Panic of 1857[4], the bankruptcy of its machine shop in 1859, and the collapse of the Pemberton Mill in 1860. Substantial build-out of the North Canal was not achieved until 1864, when only a single mill site suitable for development remained (Hay 1986:411).

Essex reached its final development phase with construction of the South Canal in 1868 and development of the Union Mill in 1871. The Union Mill, located on the South Canal and designed to accommodate tenants of various sizes, marked a critical departure from Essex's long-time policy of catering exclusively to clients interested in massive single-tenant mills (Hay 1986:408–417). Following the sale of Essex's remaining South Canal mill powers in 1881, the company entered a period of stability and profitability that extended into the mid-twentieth century. This period of stability occurred just as steam- and electric-powered motors, which both required the driving force of waterpower, made mechanical waterpower obsolete.

6 Study Results

6.1 Background Study

The background study began with a review of the MACRIS data, which is compiled from a variety of records and files maintained by the MHC. These include, but are not limited to, the Inventory of Historic Assets of the Commonwealth, NRHP nominations, State Register of Historic Places listings, Historic American Engineering Records (HAERs), and local historic district study reports. The MACRIS database assigns an inventory number to each recorded historical resource, and provides photographs and data pages with all known information regarding designer, owner, and historical significance. The MACRIS review included the identification of previously recorded cultural resources within the APE.

The background study also involved review of documentation completed as part of Lawrence Hydroelectric Associates' 1977 application for the original FERC license for the

[4] The Panic of 1857 was a financial crisis in the United States (1857 to 1861) that involved bank failures, business closures, financial collapse, and economic depression.

Lawrence Project, which included a cultural resource study of the South Canal (Casjens et al 1977).

Pertinent background study documentation is filed with this report as Appendix A. Table 6-1 summarizes relevant documentation reviewed as part of the background study. Copies of correspondence with Massachusetts SHPO, LHC, and additional parties is included in Appendix B.

Table 6-1. Background study results.

Resource	MACRIS Inventory Number	NRHP Status (NRHP ID)	Notes
North Canal Historic District	LAW.A	Listed – Historic District (84000417/09000280)	Listed in 1984; amendment and boundary increase in 2009
Great Stone Dam (Essex Dam)	LAW.907	Listed – Individual (77000184) Listed – Contributing (84000417/09000280)	
North Canal Gatekeeper's House	LAW.263	Listed – Contributing (84000417/09000280)	
North Canal	LAW.906	Listed – Individual (75000278) Listed – Contributing (84000417/09000280)	
North Canal Locks and Wasteway	LAW.931	Listed – Contributing (84000417/09000280)	
North Canal Lockkeeper’s House	LAW.316	Listed – Contributing (84000417/09000280)	No longer extant; demolished 1984
Gatehouse at Great Stone Dam	—	Listed – Contributing (84000417/09000280)	
North Canal Barn (Carriage House)	—	Listed – Contributing (84000417/09000280)	
South Canal	LAW.908	Recommended eligible	Casjens et al 1977

Notes: ID = Identifier

6.1.1 North Canal Historic District

The North Canal Historic District, located in Lawrence, is roughly bounded by the Merrimack River, Spicket River, Broadway Street, and North Canal. The district is listed in the NRHP under Criteria A and C in the areas of Architecture, Economics, Community Planning and Development, Engineering, Ethnic Heritage, Industry, and Social History. The district's period of significance is from 1845 to 1959 and it is significant at the national, state, and local levels (Hansen and Friedberg 2009; Myer and Zellie 1984). The district was entered in the NRHP in 1984 (84000417; Myer and Zellie 1984), and an amendment expanding its boundary, period of significance, and list of contributing resources was accepted in 2009 (09000280; Hansen and Friedberg 2009). According to the 2009 amendment, the district includes 63 contributing and 23 non-contributing resources. Seven of the contributing resources are located within the APE (Hansen and Friedberg 2009).

6.1.2 Great Stone Dam

The Great Stone Dam is located in the Merrimack River west of the Massachusetts State Route 28 (Broadway Street) crossing. The dam is listed in the NRHP under Criterion C in the area of Engineering, its period of significance is from 1845 to 1848, and it is significant at the state level. The dam is also a contributing resource to the North Canal Historic District (Molloy and Orfant 1976).

6.1.3 North Canal

The North Canal is located along the Merrimack River parallel to Canal Street in Lawrence. The canal is listed in the NRHP under Criteria A and C in the areas of Engineering, Industry, and Transportation. Its period of significance is from 1845 to 1848, and it is significant at the state level. The canal is also a contributing resource to the North Canal Historic District (Dobbs and Molloy 1975). The North Canal Gatehouse and North Canal Wasteway contribute to the North Canal.

6.1.4 South Canal

The South Canal is located along the Merrimack River, parallel to Merrimack Street in Lawrence. The canal has been recommended eligible for the NRHP under Criterion C in the areas of Engineering and Architecture (Casjens et al. 1977:45–46). The 1977 recommendation did not include a period of significance or level of historic significance. Its initial construction was completed in 1867, then its length was extended in four phases ending in 1910. To maintain consistency with the North Canal, the South Canal is presumed significant at the state level. The South Canal Gatehouse contributes to the NRHP-eligible South Canal.

6.2 Identified Waterpower Equipment

As a result of the October 2024 site visit, identified historic-age waterpower equipment within the APE includes equipment in the North Gatehouse, the North Canal Wasteway,

the South Canal Gatehouse, the South Canal Wasteway, and along the walls of both canals (penstock headgate systems). Figure 6-1 shows the identified equipment in relation to the APE. The North Gatehouse, the North Canal Wasteway, the South Canal Gatehouse, the South Canal Wasteway, and the equipment contained within them are owned by Essex. The penstock headgate systems and equipment built into the walls of the canals are not owned or operated by Essex, nor are they licensed Project structures. The penstock headgate systems are owned by their respective related mill power or land owners.

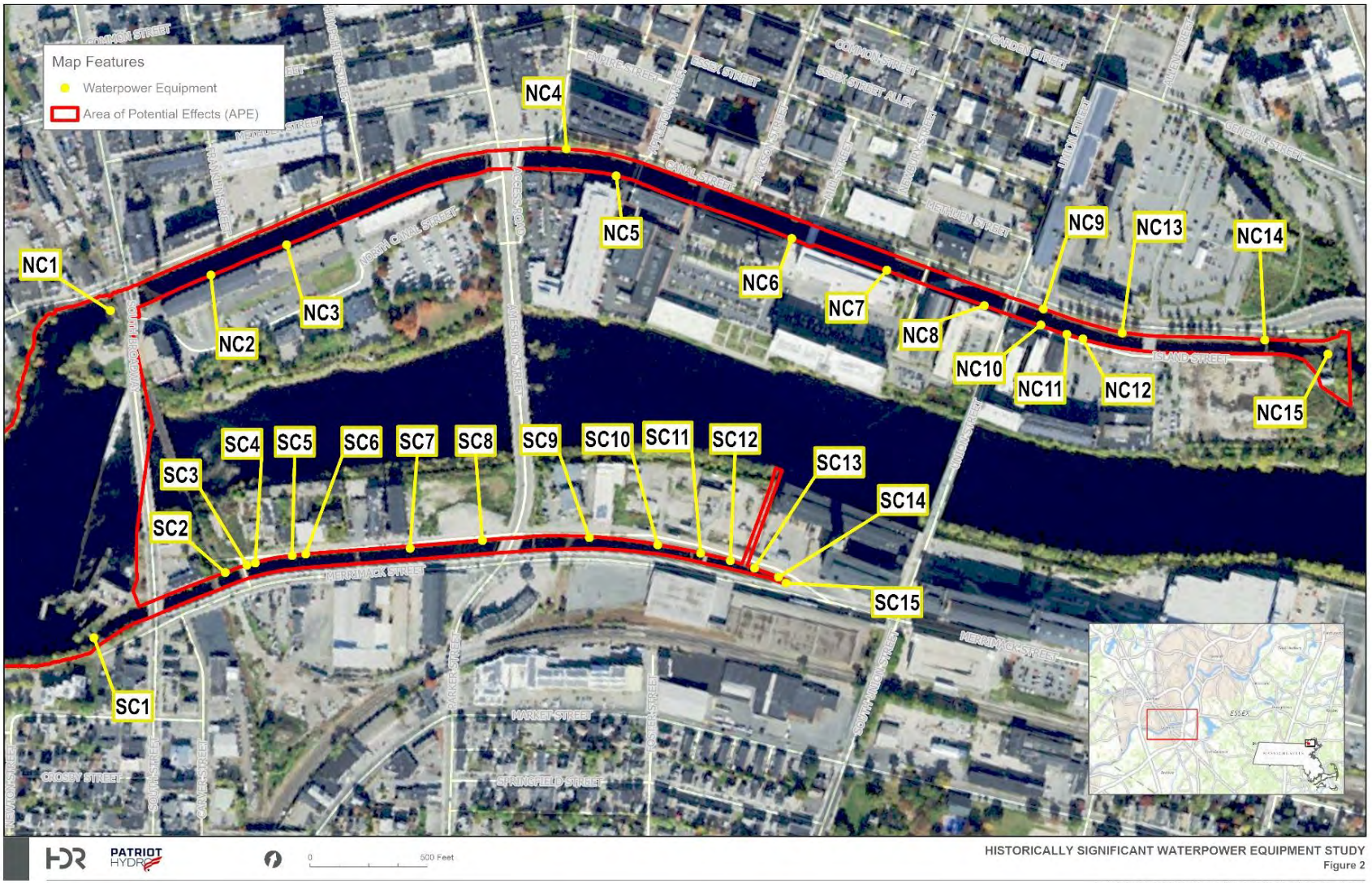


Figure 6-1. Identified historic-age waterpower equipment within the APE.

6.2.1 North Canal Gatehouse

The North Canal Gatehouse (also referred to as the Gatehouse at the Great Stone Dam and a contributing resource to the North Canal Historic District), constructed in 1848, is positioned over the canal's head, adjacent to a forebay off the Great Stone Dam impoundment (

Figure 6-2). The canal head is organized into six sluiceways, each 9 feet wide by 12 feet high and separated by 3-foot-thick, cut-stone piers (

Figure 6-3 and

Figure 6-4). As designed, control of water flow into the canal was governed by sets of timber leaf gates sliding into grooves on the upstream edges of the sluice piers. Each set consisted of four gate panels arranged in cascading order from a bottommost gate on the upstream side of each sluiceway to an uppermost gate in a downstream position (Figure 6-5).

The gates are of timber construction consisting of gate panels with braced stems (Figure 6-6). Each gate panel is 3 feet, 3 inches in height; 9 feet, 9 inches in width; and 9 inches thick. The panels are held together with through-bolts and equipped with brass plates on their sealing surfaces to prevent abrasion. Combined with their stems, from upstream to downstream, the gates are 24 feet, 10 inches; 21 feet, 5 inches; 18 feet, 5 inches; and 15 feet, 5 inches in height.

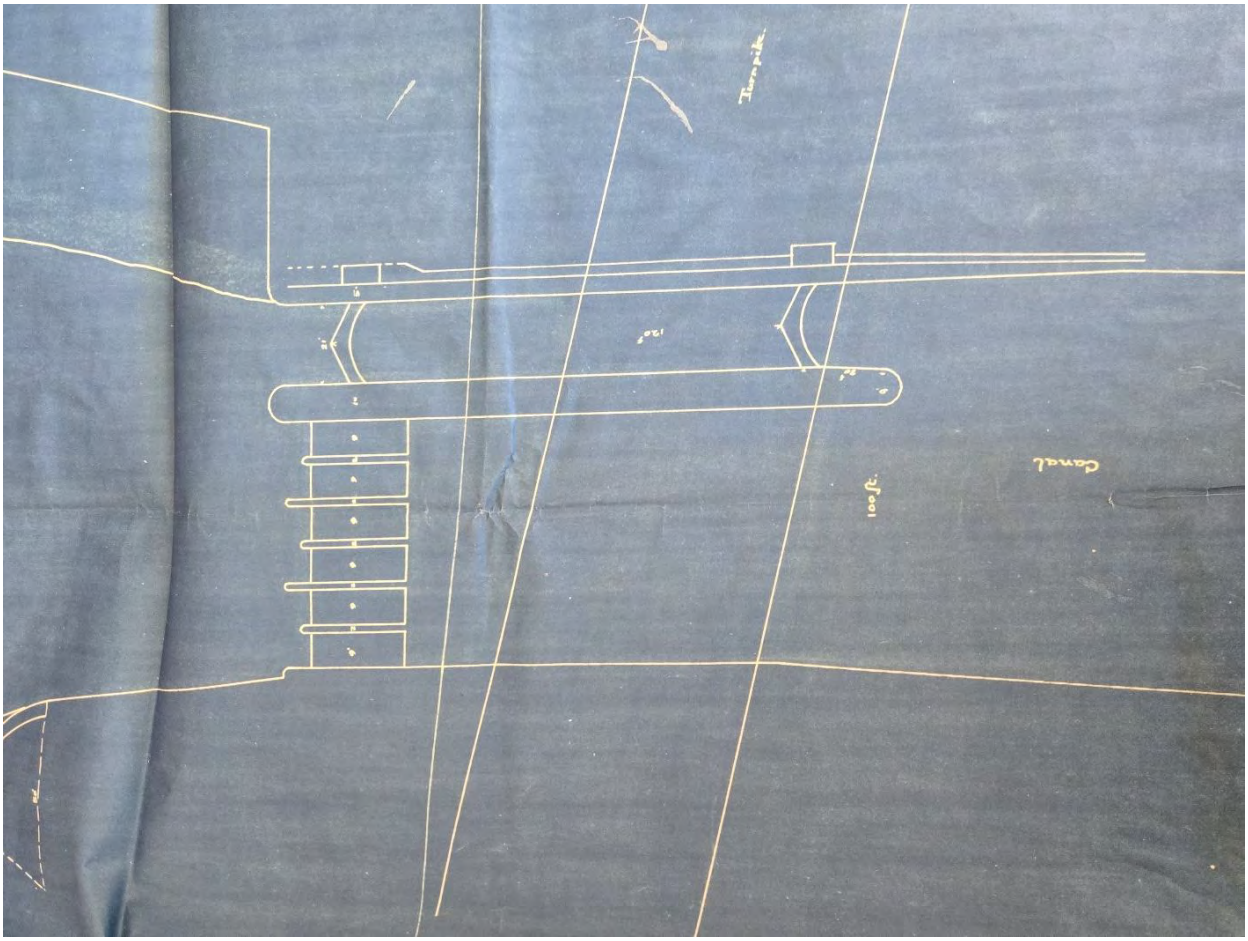
The gates are lifted by rack-and-pinion hoists positioned above the gates and enclosed in the gatehouse (deepest, upstream gate), and by sequential pawl activations thereafter (next 3 downstream gates in order). The hoists are braced directly into the gatehouse's timber framing members, and the gatehouse's wood plank floor has gates astride each hoist, giving access to the gates and sluices below (Figure 6-7 through Figure 6-11).

As designed, each gate was hoisted by hand-cranked, cast-iron gears to control the flow of water from the impoundment to the canal. In 1961, the hoisting mechanisms were augmented with electric motors joined to the lifting gears with rubber belts (Figure 6-12 and Figure 6-13) (Molloy 1975). Charles Storrow, Chief Engineer and Treasurer of the Essex Company, designed the original gate systems. The machinery was fabricated at Essex's Lawrence machine shop circa (ca.) 1848.

In 2012, metal stoplogs were installed across four of the sluiceways; the center two sluiceways have no stoplogs emplaced. The gates are no longer operable and no longer manage water flow into the canal. During the 2024 site visit, the outer gates were observed to be either partially or fully submerged, and in poor condition. The center sluiceway gates were not visible for an accumulation of debris.

Note: The former navigation lock visible north (left) of the Gatehouse was taken out of service and its gates replaced with masonry walls in 1961. Also, the wood frame gallery underneath the gatehouse is missing its two outermost sections, which were removed to install the metal stoplogs.

Figure 6-2. North Canal Gatehouse and forebay, view facing east.

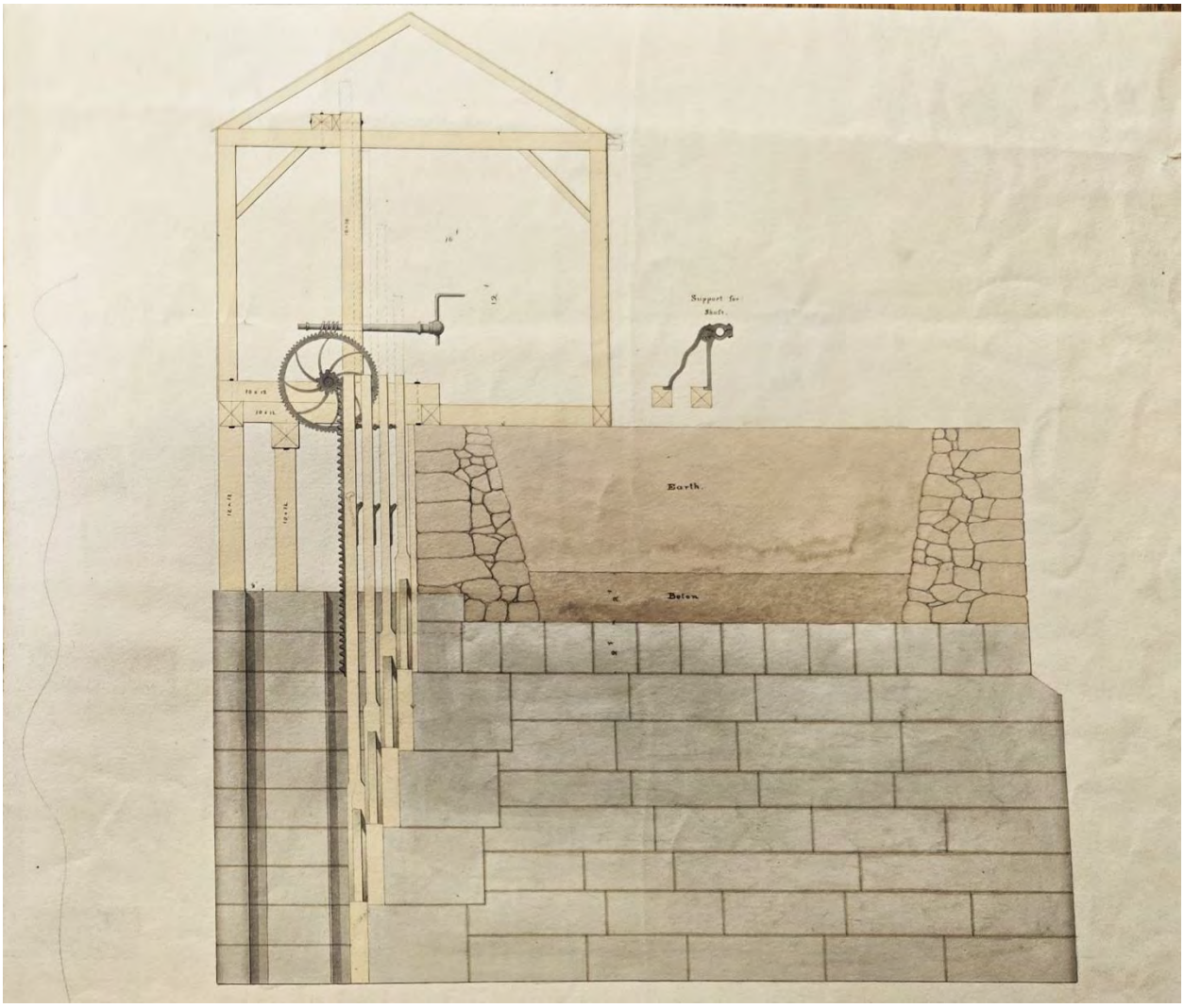


Source: Image courtesy of Lawrence History Center.

Figure 6-3. Detail of undated blueprint plan of the North Canal showing the six sluiceways and former navigation lock.

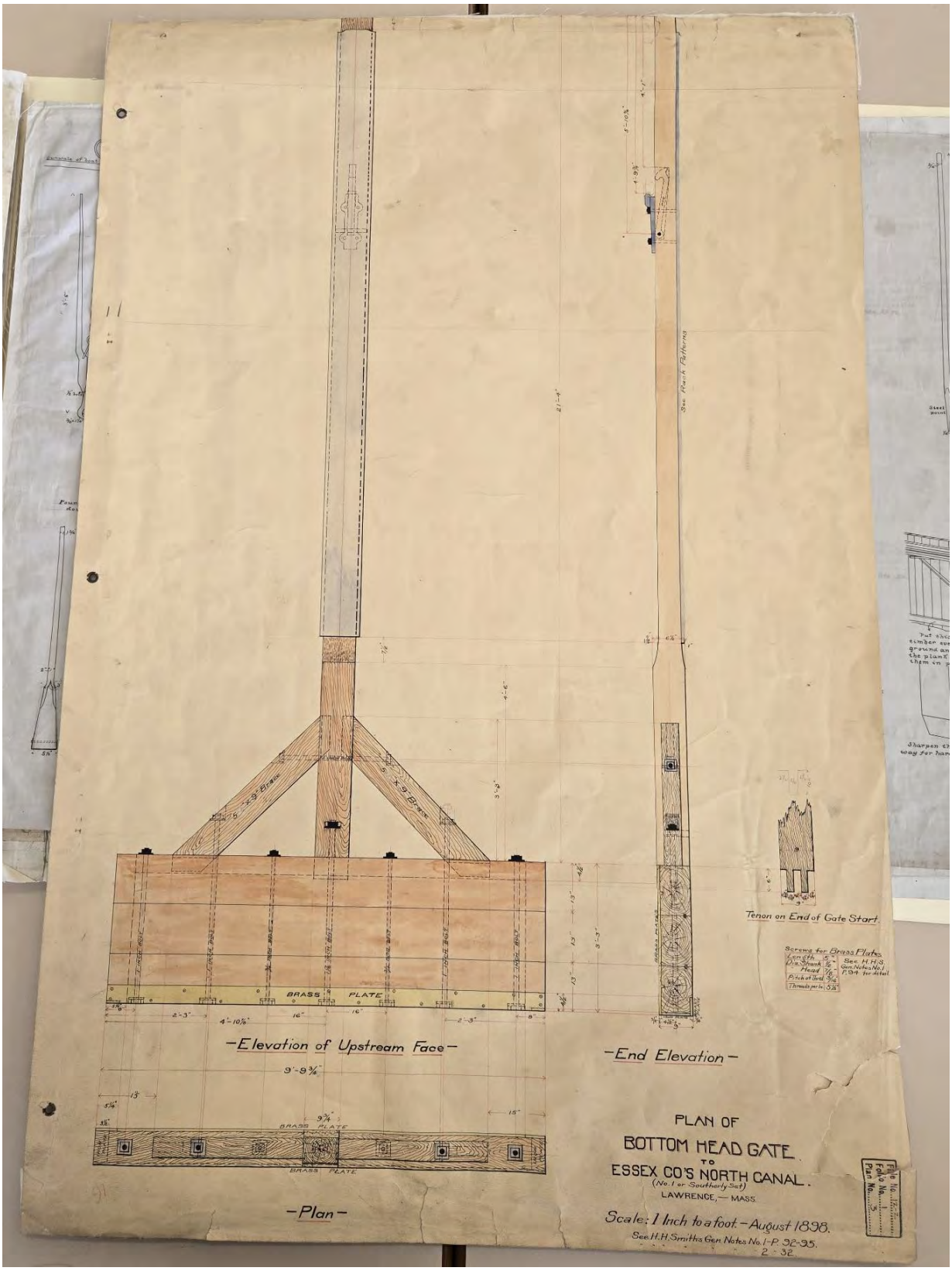
Note: The metal stoplogs visible upstream of the outer sluiceways were installed in 2012.

Figure 6-4. Upstream image of the North Canal Gatehouse showing the two open middle sluiceways and a single gate stem.



Source: Image courtesy of Lawrence History Center.

Figure 6-5. Detail of undated drawing of the North Canal Gatehouse showing gate arrangement.



Source: Image courtesy of Lawrence History Center.

Figure 6-6. August 1898 measured drawing of North Canal Leaf Gate Number 1 drawn by H.H. Smith.

Figure 6-7. Interior view of the North Canal Gatehouse, showing gate arrangement and gate-lifting equipment; view facing northwest.

Figure 6-8. Interior view of the North Canal Gatehouse, showing gate arrangement and gate-lifting equipment; view facing southeast.

Figure 6-9. Detail of the North Canal Gatehouse gate hoist, with leaf gate stems visible on the lower right; view facing northwest.

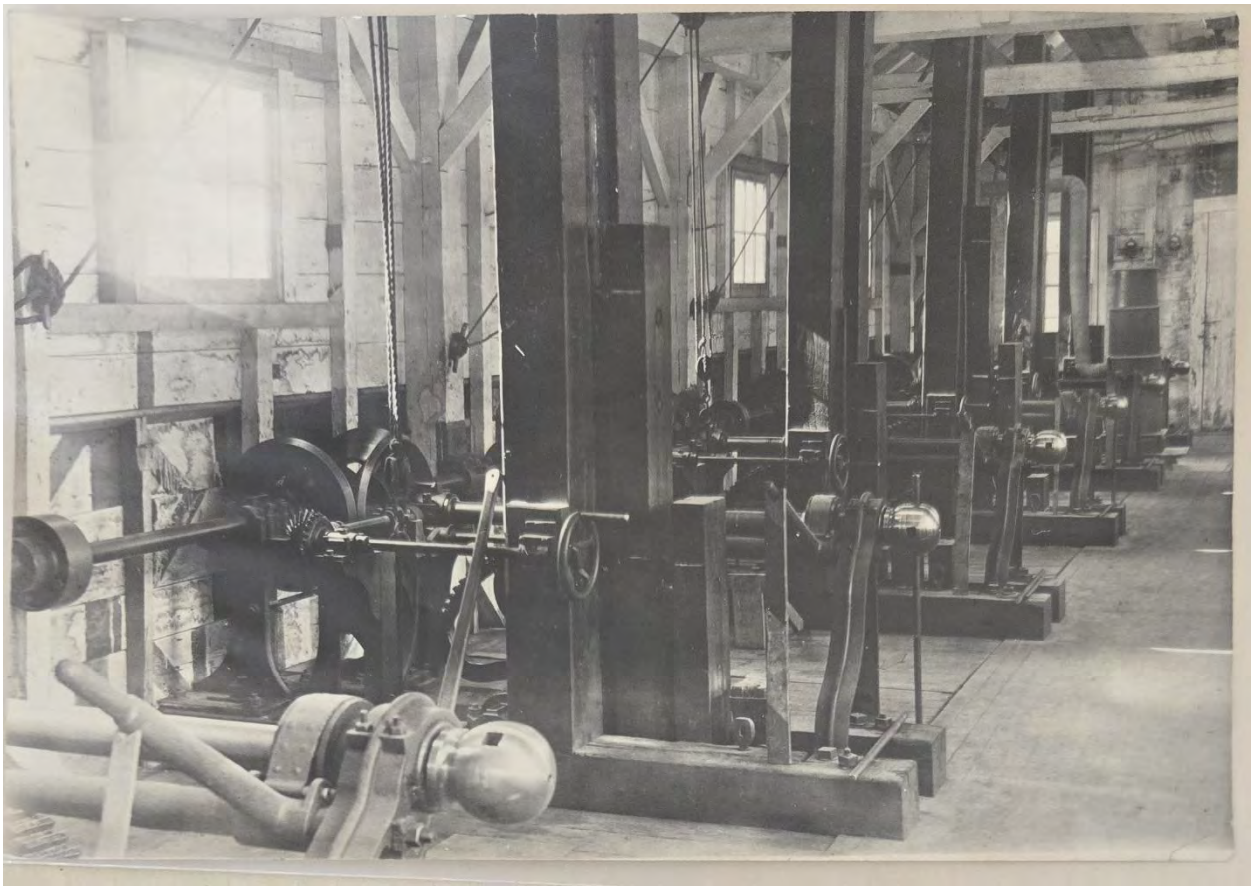
Figure 6-10. Detail of the North Canal Gatehouse gate hoist, view facing south.

Note: All four leaf gate stems are visible, as are the two downstream gate panels. The upstream gate panels are submerged. All four stems appear rotted, and the most upstream stem has completely rotted off its gate panel.

Figure 6-11. View of the gates from the gatehouse access way (downstream on left, upstream on right).

Source: Dengler et al. 1995

Figure 6-12. Interior view of the North Canal Gatehouse in 1898, showing gate tender Tom Holmes operating a gate.



Source: Image courtesy of Lawrence History Center.

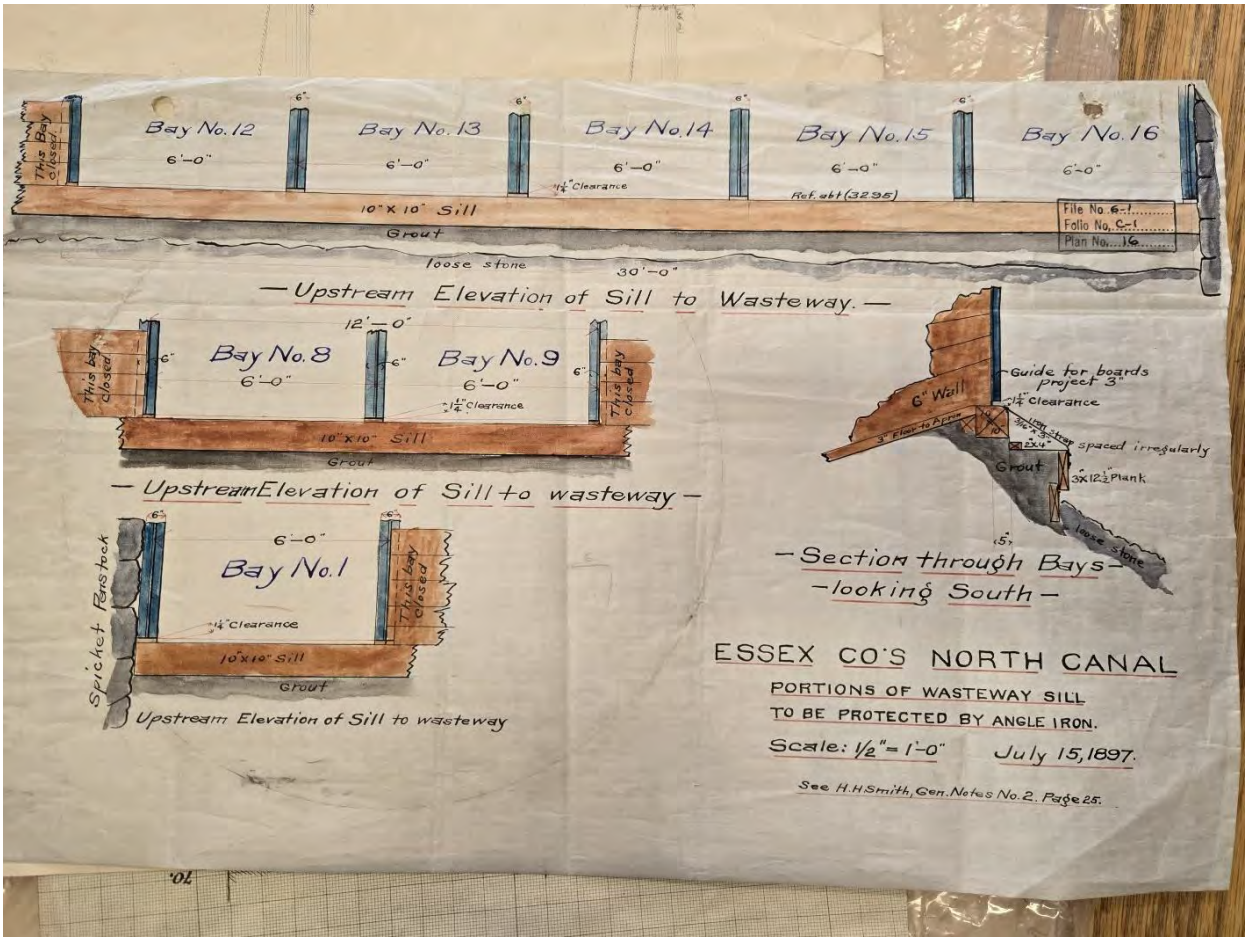
Figure 6-13. Undated interior view of North Canal Gatehouse.

6.2.2 North Canal Wasteway

The North Canal Wasteway, which controls the outflow and water level in the canal, was constructed in 1848 and is located on the eastern end of the North Canal, above the Spicket River's confluence with the Merrimack River (Figure 6-14 and Figure 6-15). The structure consists of a cut stone overflow dam spanning the width of the canal with a stone spillway on its downstream side. The overflow dam has 16 6-foot-wide sluiceways with metal guides that, together with upstream water pressure, hold flashboards in place. The flashboards are stacked on each other and allow fine tuning of the spillway elevation (Hay 1986:107–108). A timber catwalk spans the sluiceway, allowing access for the wasteway operators (Figure 6-16). The dam has three drain gates below the sluiceway that allow the canal to be drained. Similar to the head of the canal, the gates are hoisted with rack-and-pinion gears that were originally protected with small enclosures (Figure 6-17 and Figure 6-18). Charles Storrow designed the wasteway, gates, and hoists, and the machinery was fabricated at Essex's Lawrence machine shop ca.1848. During the 2024 site visit, in-kind repairs were observed. The structure remains in operation.

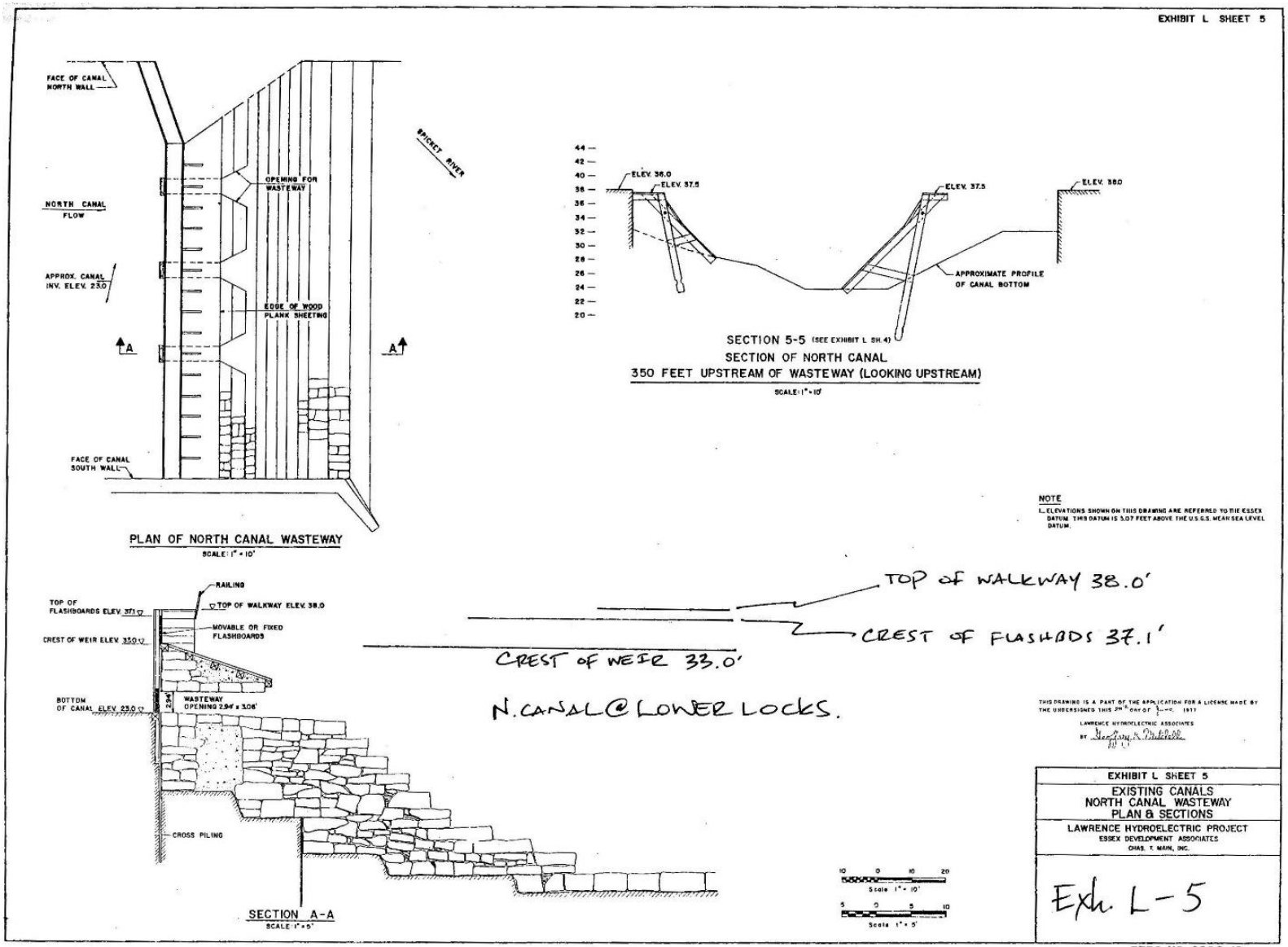
Source: Photograph courtesy of Essex.
Figure 6-14. Upstream view of the North Canal Wasteway with sluiceways and drain gate hoists, view facing north.

Figure 6-15. Downstream view of the North Canal stone spillway into the Spicket River, view facing south.



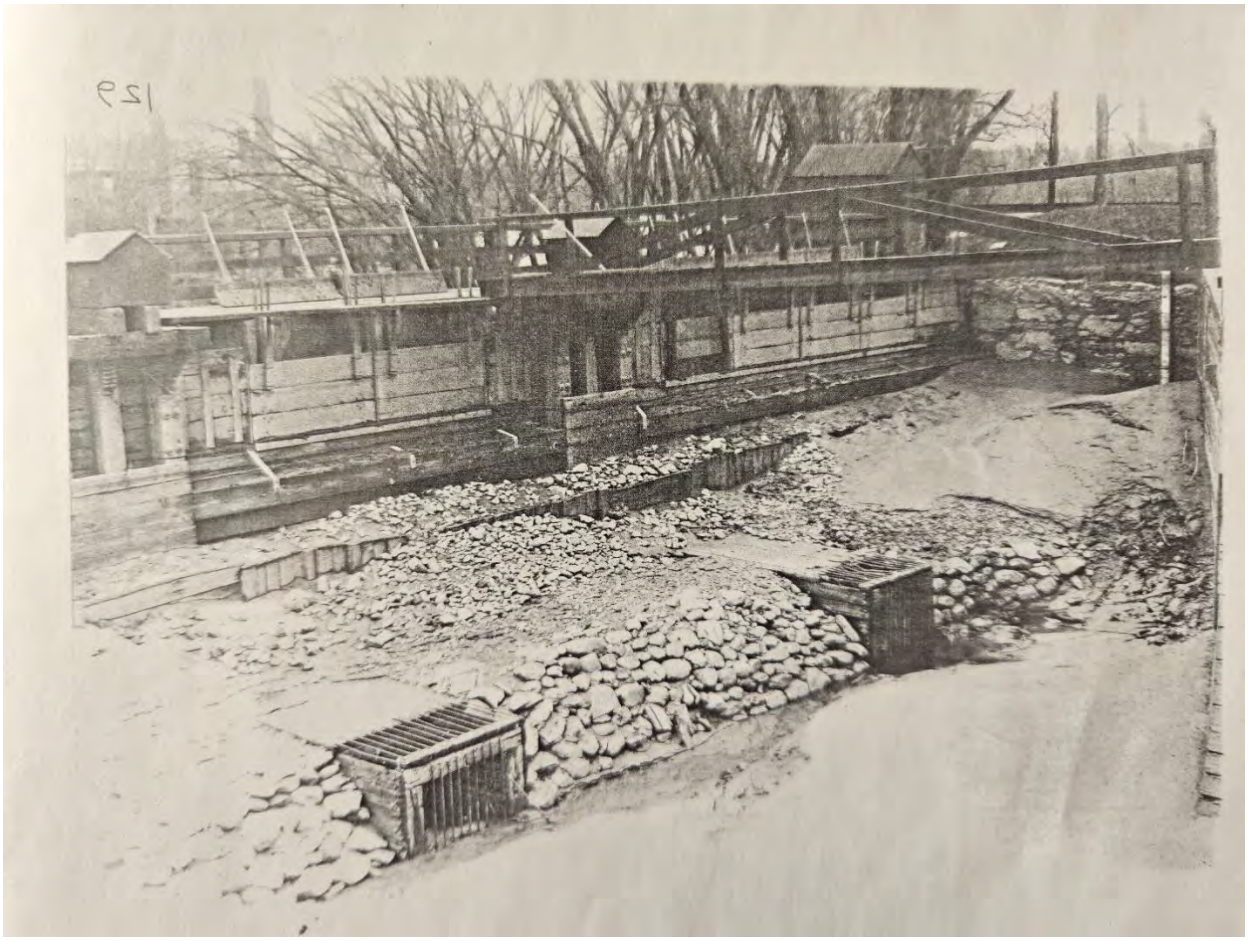
Source: Image courtesy of Lawrence History Center.

Figure 6-16. July 1897 measured drawing of the North Canal Wasteway by H.H. Smith.



Source: Drawing courtesy of Essex.

Figure 6-17. 1977 measured drawings of North Canal Wasteway.



Source: Image courtesy of Lawrence History Center.

Figure 6-18. Undated photograph of the North Canal Wasteway, showing upstream view of drains and their hoist enclosures.

6.2.3 South Canal Gatehouse

The South Canal Gatehouse, completed in 1868, is virtually identical in design to the North Canal Gatehouse, but constructed on a smaller scale (Figure 6-19). Similar to the northern structure, the South Canal Gatehouse is positioned over the canal's head, adjacent to a forebay off the Great Stone Dam impoundment (Figure 6-20). The canal head is organized into four sluiceways constructed of dressed granite with mortared joints; bedrock serves as the canal's foundation. The gatehouse building is constructed above the sluiceways on a substructure consisting of cast iron columns with timber framing (

Figure 6-21 and Figure 6-22) (Casjens et al. 1977:45–46). Sets of timber leaf gates control water flow into the canal and consist of four gates of varying heights arranged in cascading order from a bottommost gate on the upstream side of each sluiceway to an uppermost gate in a downstream position.

Nearly identical to the North Canal Gatehouse headgates, the gates are of timber construction, consisting of gate panels with braced stems. Each gate panel is 3 feet, 3 inches in height; 9 feet, 9 inches in width; and 9 inches thick. The panels are held together with through bolts and equipped with brass plates on their sealing surfaces to prevent abrasion. Combined with their stems, from downstream to upstream, the gate panels with their stems are 24 feet, 5 inches; 21 feet, 5 inches; 18 feet, 5 inches; and 15 feet, 5 inches in height, respectively (Figure 6-23 and Figure 6-24).

The gates were lifted on rack-and-pinion hoists, positioned above the gates and enclosed in the gatehouse (deepest, upstream gate), and by sequential pawl activations thereafter (next 3 downstream gates in order). The hoists are braced directly into the gatehouse's timber framing members, and the gatehouse's wood plank floor has gates astride each lift, giving access to the gates and sluices below (Figure 6-25 through Figure 6-30). As originally designed, each gate was hoisted by hand-cranked, cast-iron gears (Figure 6-31). In 1961, the lifting mechanisms were augmented with electric motors joined to the lifting gears with rubber belts. Benjamin Coolidge, Essex Company resident engineer, under the supervision of Charles Storrow, designed the original gate systems. An area fabricator likely performed the fabrication of the equipment because the Essex Machine Shop declared bankruptcy and failed in 1859. Artemas Parker constructed the gatehouse and canal (Casjens et al. 1977; Molloy and Hyde 1976).

Ca. 2010-2012, metal stoplogs were installed across all four of the sluiceways. The gates are no longer operable and no longer manage water flow into the canal. During the 2024 site visit, the gates were observed to be either partially or fully submerged, and in poor condition.

Source: Dengler et al. 1995
Figure 6-19. Construction of the South Canal sluiceways ca. 1865.

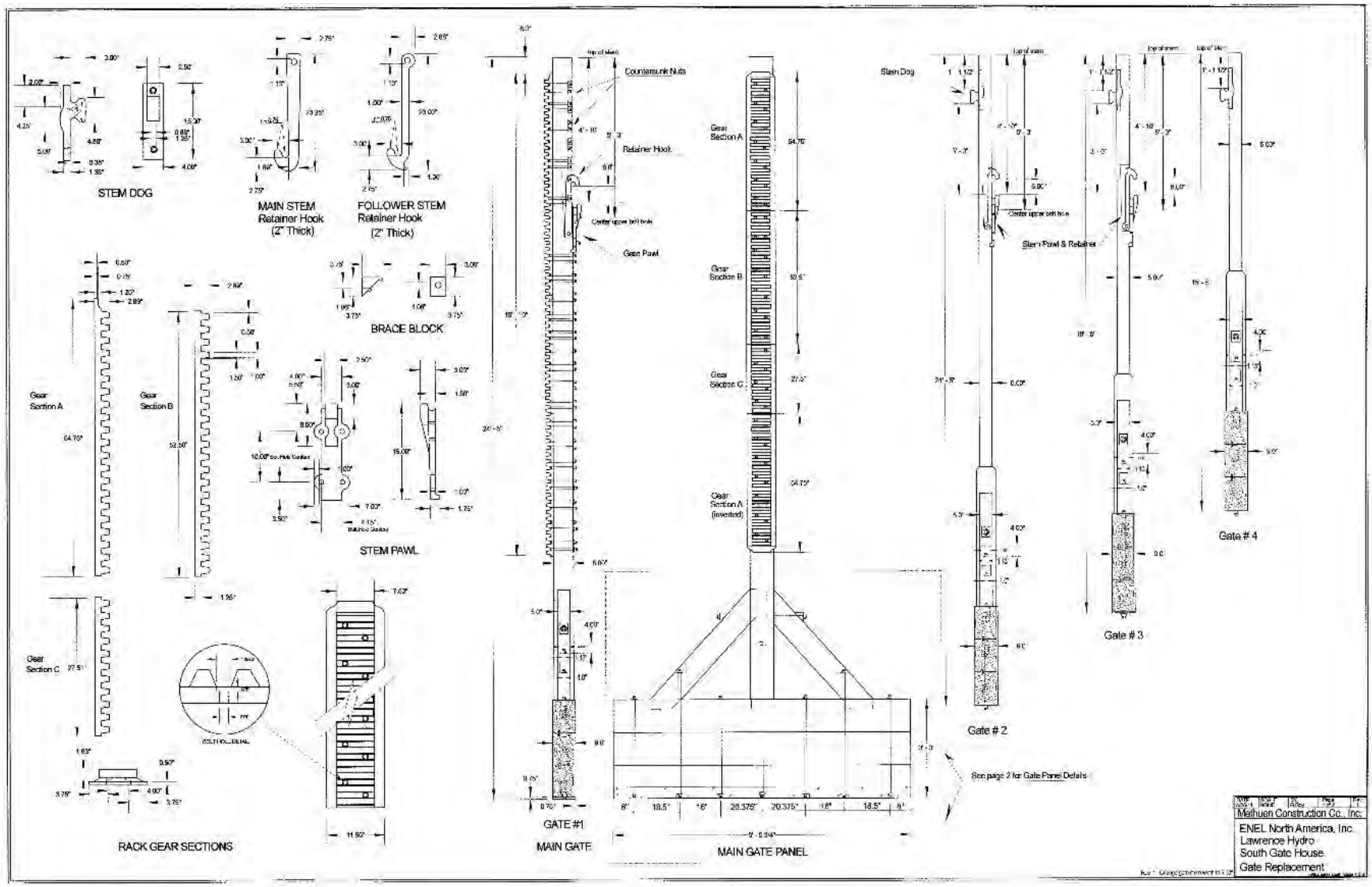
Note: The hydroelectric facility north (left) of the gatehouse was completed in 1981.

Figure 6-20. Aerial drone photograph showing the Merrimack River (left), South Canal (middle), and South Canal Gatehouse (lower right); view facing east.

Note: The metal stoplogs on the upstream side of the gates were installed in 2012. The wood frame gallery underneath the gatehouse is no longer extant, having been removed to install the stoplogs.

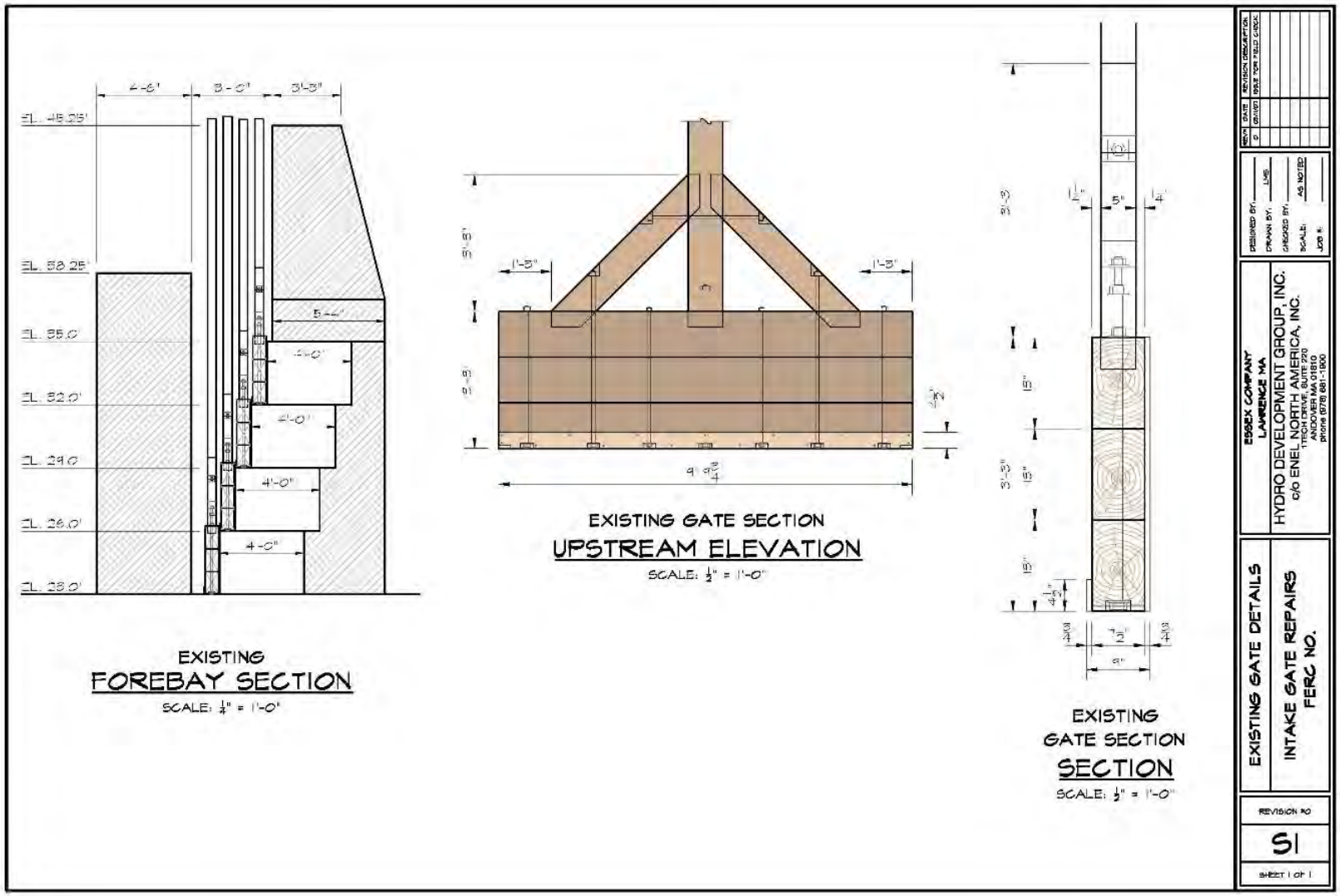
Figure 6-21. Upstream photograph of the South Canal sluiceways, gates, and cast-iron substructure; view facing south-east.

Figure 6-22. Photograph of the South Canal Gatehouse and sluiceway downstream side, view facing southwest.



Source: Image courtesy of Essex.

Figure 6-23. Measured drawings of the South Canal leaf gates.



Source: Image courtesy of Essex.

Figure 6-24. Measured drawings of the South Canal leaf gate panels and arrangement.

Figure 6-25. Interior view of the South Canal Gatehouse, showing gate arrangement and gate-lifting equipment; view facing northwest.

Figure 6-26. Interior view of the South Canal Gatehouse, showing gate arrangement and gate-lifting equipment; view facing southeast.

Figure 6-27. Detail of the South Canal Gatehouse manual and electric hoisting systems, view facing west.

Figure 6-28. Detail of the South Canal Gatehouse manual and electric hoisting systems, and leaf gate stems (lower right); view facing west.

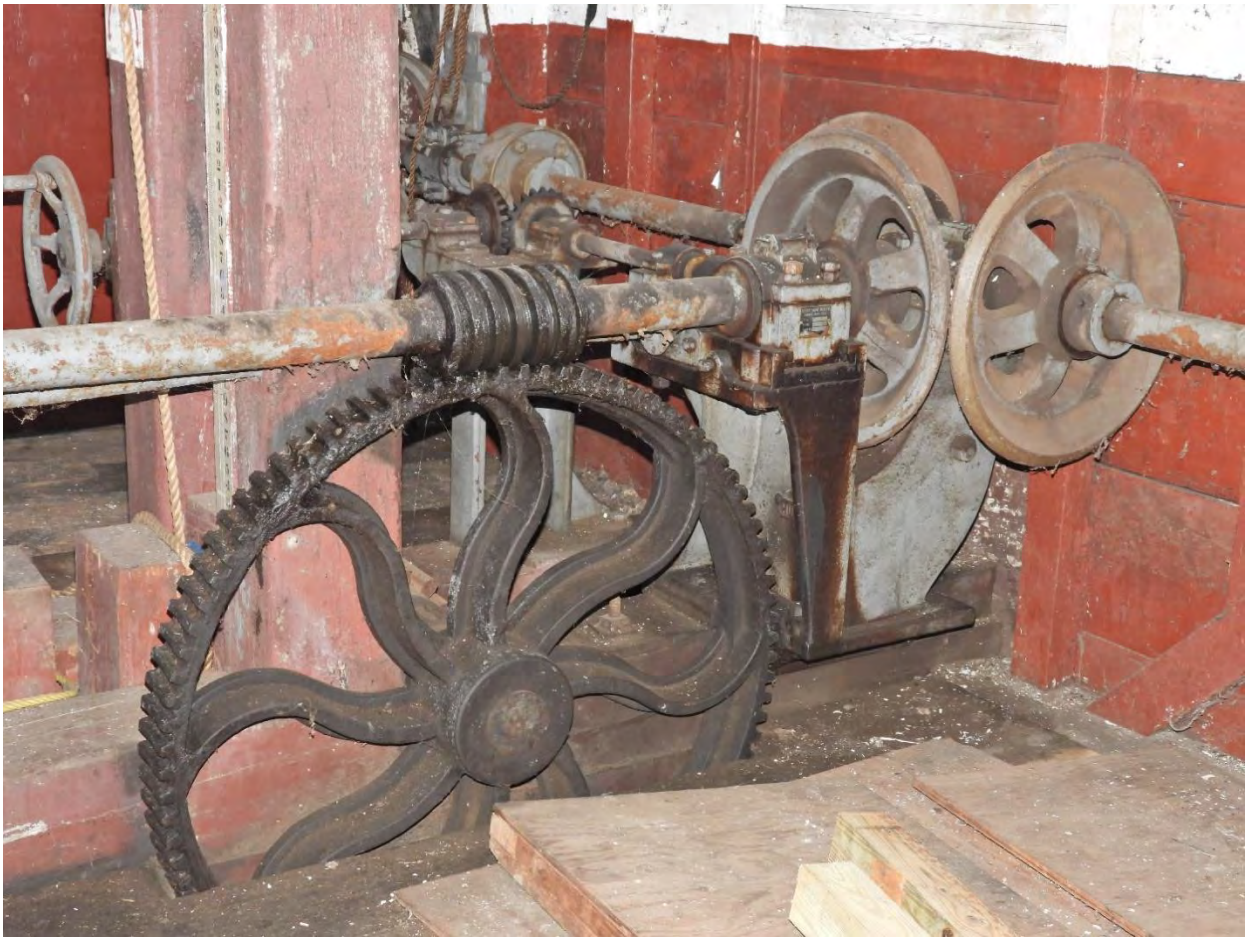
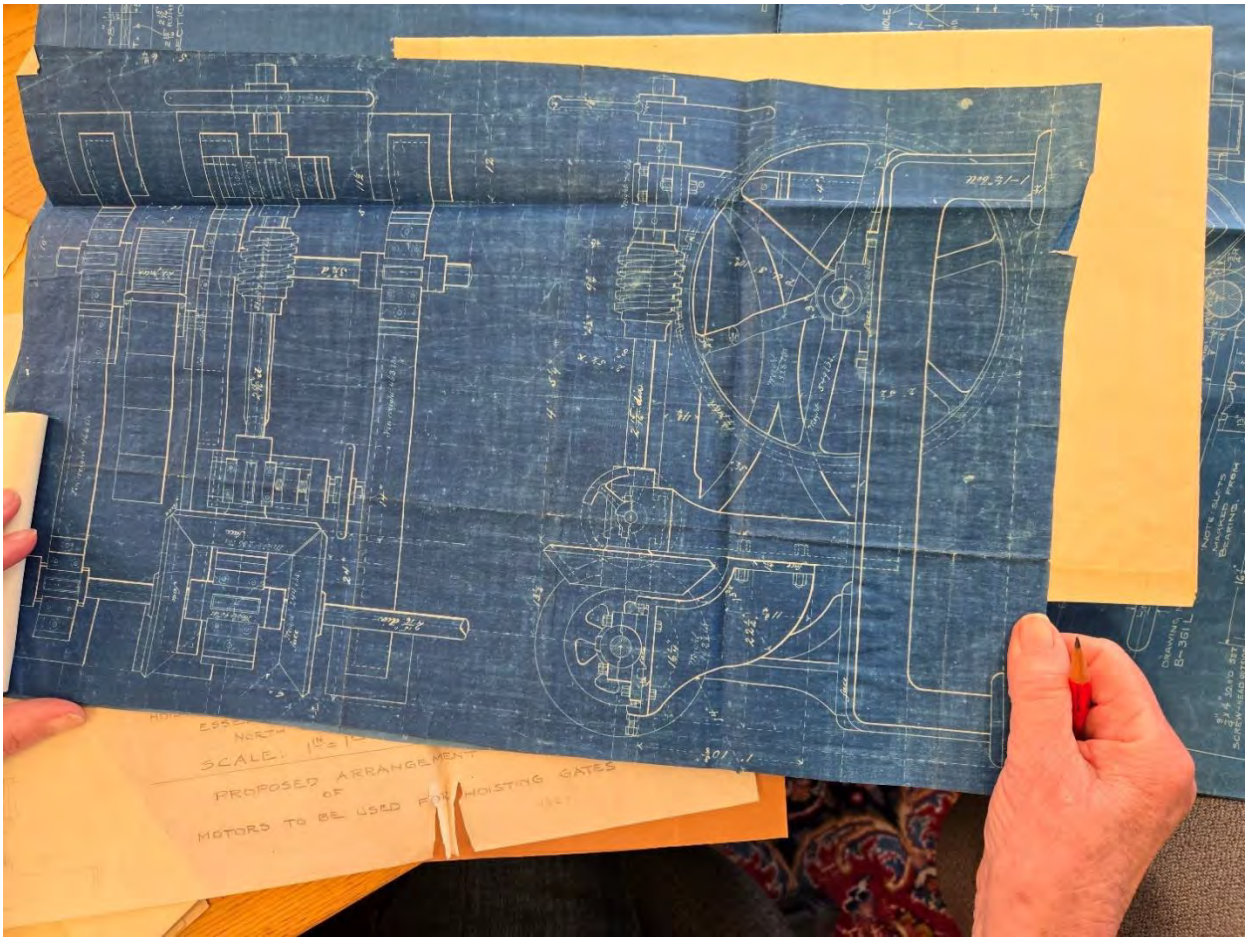


Figure 6-29. Detail of the South Canal Gatehouse hoisting equipment, view facing south.

Note: All four gate stems are visible, as are three downstream gate panels. The upstream gate panels are submerged, and its stem has broken in two.

Figure 6-30. View of the gates from the gatehouse access way (upstream top, downstream bottom).



Source: Image courtesy of Lawrence History Center.

Figure 6-31. Undated blueprint of gate hoist mechanism.

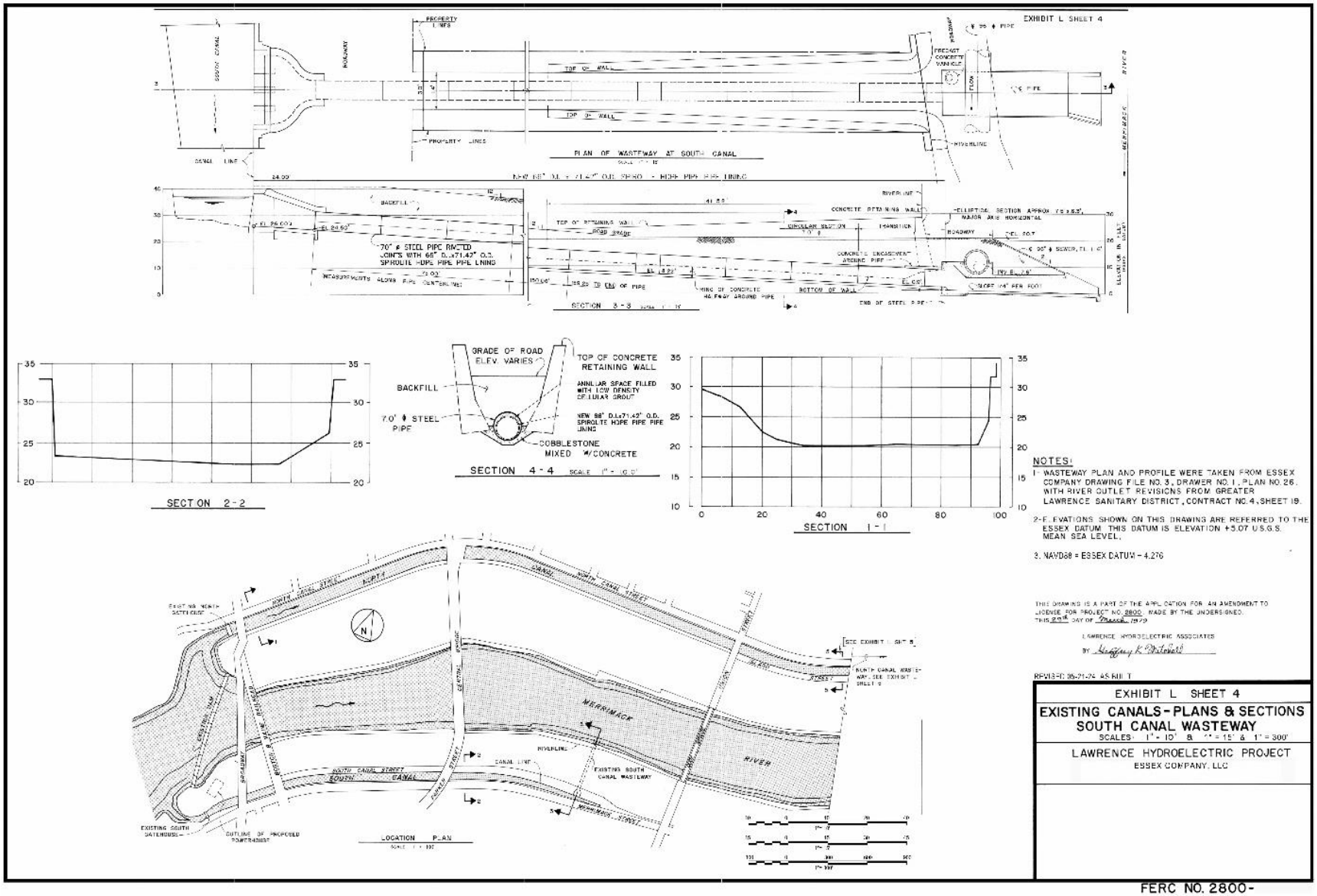
6.2.4 South Canal Wasteway

The South Canal was constructed in six stages between 1866 and 1906. The wasteway, which controls the amount of water allowed to remain in the canal, was constructed during the final expansion phase in 1906 and is located approximately 150 feet west of the canal's terminus (Molloy and Hyde 1976). The structure consists of a waste weir on the canal's northern wall that feeds an approximately 450-foot-long subterranean penstock that extends northward, draining into the Merrimack River (Figure 6-32 and Figure 6-33). The cast-concrete overflow weir has four sluiceways with metal guides that, together with upstream water pressure, hold the flashboards in place. Below the sluiceways is a single gate that allows the canal to be drained. The drain has a timber gate that is hoisted with rack-and pinion gears (Figure 6-34). The weir operated via overflow into the wasteway, which was fine-tuned using flashboards to achieve the desired canal elevation.

Essex designed the wasteway system ca. 1906. An area fabricator likely performed fabrication of the weir equipment because the Essex Machine Shop failed in 1859. As originally constructed, the wasteway was built in an open trench lined with stone masonry walls. The trench was filled at an unknown date.

On January 3, 2023 a sinkhole was reported to have formed near the northerly (outlet) end of the South Canal Wasteway, likely caused by a leak in the wasteway penstock. Essex repaired the penstock by slip-lining it with sections of Spirolite pipe. The repair work was completed in early November, 2023. There have been no further leakage incidents associated with the South Canal Wasteway. On June 1, 2023, the SHPO determined the repairs would have no adverse effect on historic resources.

Although the canal was drawn down during the 2024 site visit, the wasteway appeared to be in operable condition.



Source: Image courtesy of Essex.

Figure 6-32. Measured drawings of the South Canal Wasteway.

Source: Image courtesy of Lawrence History Center.
Note: The photograph was taken prior to the filling of the wasteway trench and the outlet's extension that allowed for construction of a roadway and sewer line. Both modifications occurred at an unknown date.

Figure 6-33. 1917 photograph of the South Canal Wasteway outlet to the Merrimack River, view facing southwest.

Figure 6-34. View of the South Canal Wasteway with sluiceways, flashboards, drain gate, and hoist; view facing northwest.

6.2.5 Penstock Headgate Systems

Essex identified a total of 26 penstock headgate systems, with 13 along each canal. Table 6-2 details the systems and the condition of their components. As originally constructed, each system, which governed the canal's flow into mill penstocks, consisted of a set of tandem trash racks, headgates, hoists, and hoist enclosures. Each mill owner was responsible for construction and maintenance of its intake and headgate systems, which were frequently designed and fabricated by Essex (Figure 6-35 and Figure 6-36) (Hay 1986:429). The tandem racks consisted of coarse outer timber racks that filtered large floating debris and ice, and finer inner sets of closely set metal bars that trapped leaves and smaller ice (Figure 6-37). The headgates consisted of timber gates with geared stems. Rack-and-pinion hoists housed in timber enclosures operated the gates (Figure 6-38 through Figure 6-40). None of the timber enclosures are extant (Figure 6-41 and Figure 6-42).

Regarding fabrication of the headgate systems, the relationship between Essex, which was a vertically integrated real estate, waterpower, and industrial development enterprise, and its clients was such that Essex delivered turnkey solutions. Typical development agreements included both waterpower infrastructure and fully fitted manufacturing plants complete with manufacturing machinery (e.g., mills, looms, spindles) and the internal powertrain equipment that delivered mechanical power throughout the plants. The Essex Machine Shop, which operated from ca. 1846 until 1859, was underused throughout its lifetime. Although the Machine Shop was a state-of-the-art facility at the time, its bankruptcy and subsequent failure suggests that it was not critical to the area's ongoing development, and by the 1850s, the local fabrication market had likely become saturated (Hay 1986:285).

During the 2024 site visit, the systems were observed to be in conditions ranging from no longer extant (SC4; note "SC" numbers correspond to "Resource ID" in Table 6-2) to fully extant (SC5). None of the systems appear to be operable. Furthermore, the location of Resource SC7 (which includes a hoist that bears an Essex Machine Shop mark) on the South Canal suggests waterpower equipment was repurposed. The South Canal was constructed after the Essex Machine Shop's failure, so the hoist was likely moved from the North Canal.

The penstock headgate systems and equipment built into the walls of the canals are owned by their respective related mill owners and are not licensed Project structures. Essex does not own the penstock headgate systems and has no associated rights to these structures.

Table 6-2. Penstock headgate system conditions.

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
NC2	No	No, penstocks sealed with concrete plugs	No	
NC3	No	No, penstocks sealed with concrete plugs	No	

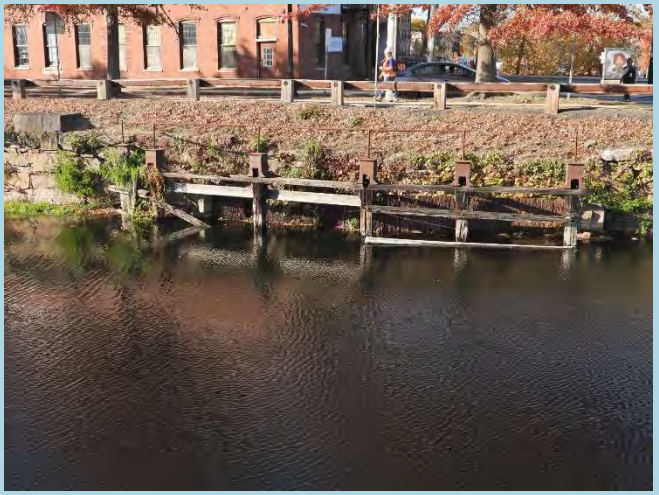
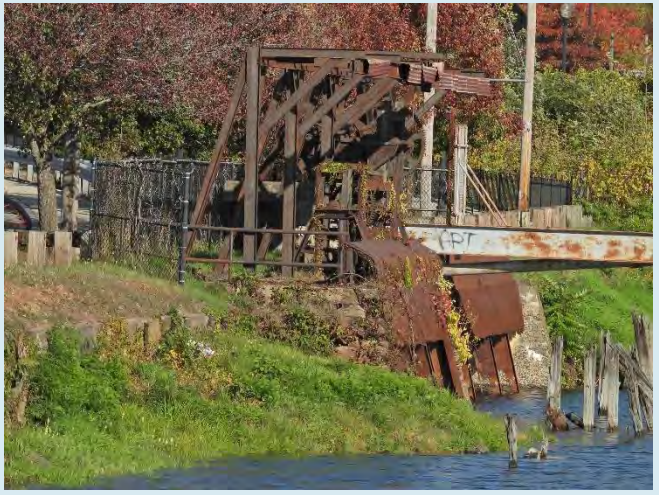
Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
NC4	No	No, penstock sealed with concrete plug	No	
NC5	Yes, outer rack partially extant	No	Yes, single hoist extant	

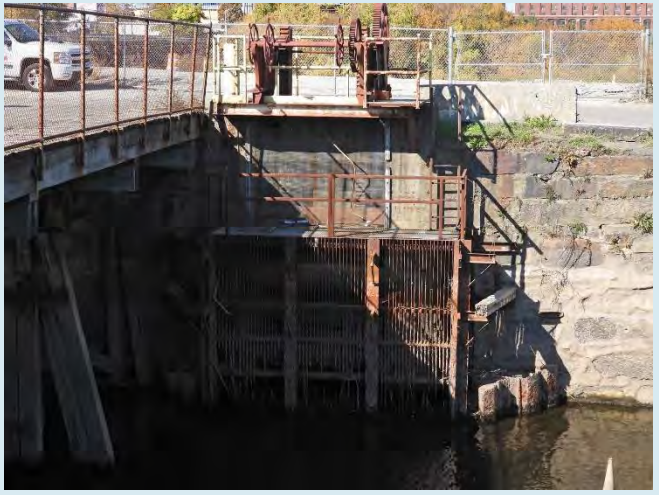
Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
NC6	No	No	Yes	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
NC7	Yes, outer rack partially extant	No	Yes	
NC8	Yes, outer rack partially extant	Yes, partially extant, single gate stem visible	No	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
NC9	Yes, both inner and outer racks partially extant	No	No	
NC10	Yes, both inner and outer racks partially extant	Yes, single gate stem extant	Yes, single hoist extant	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
NC11	No	No, penstock sealed with concrete plug	No	
NC12	Yes; trash rack posts extant	No, penstock filled and incorporated into canal wall	No	

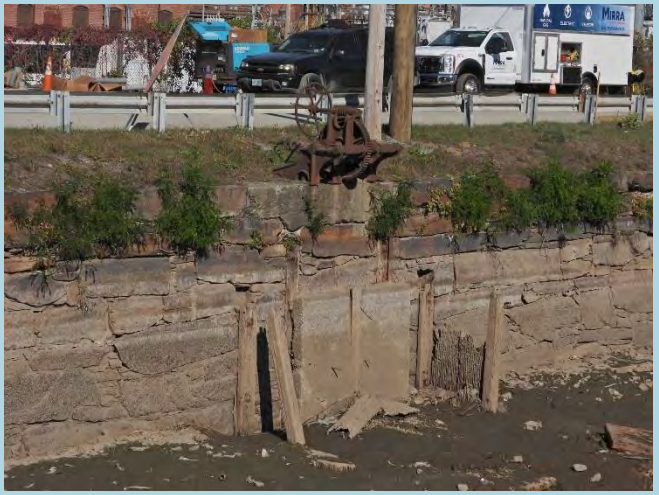
Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
NC13	Yes, both inner and outer racks partially extant	No	No	
NC14	Yes, both inner and outer racks partially extant	No	Yes	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
SC2	Yes, inner rack partially extant	Yes, gate head panel extant	Yes	
SC3	Yes, inner rack extant	Yes	Yes	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
SC4	No	No	No	
SC5	Yes	Yes	Yes	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
SC6	Yes; inner rack extant	No; penstock sealed with stoplogs	No	
SC7	Yes; inner rack extant	No; penstock sealed with stoplogs	Yes	

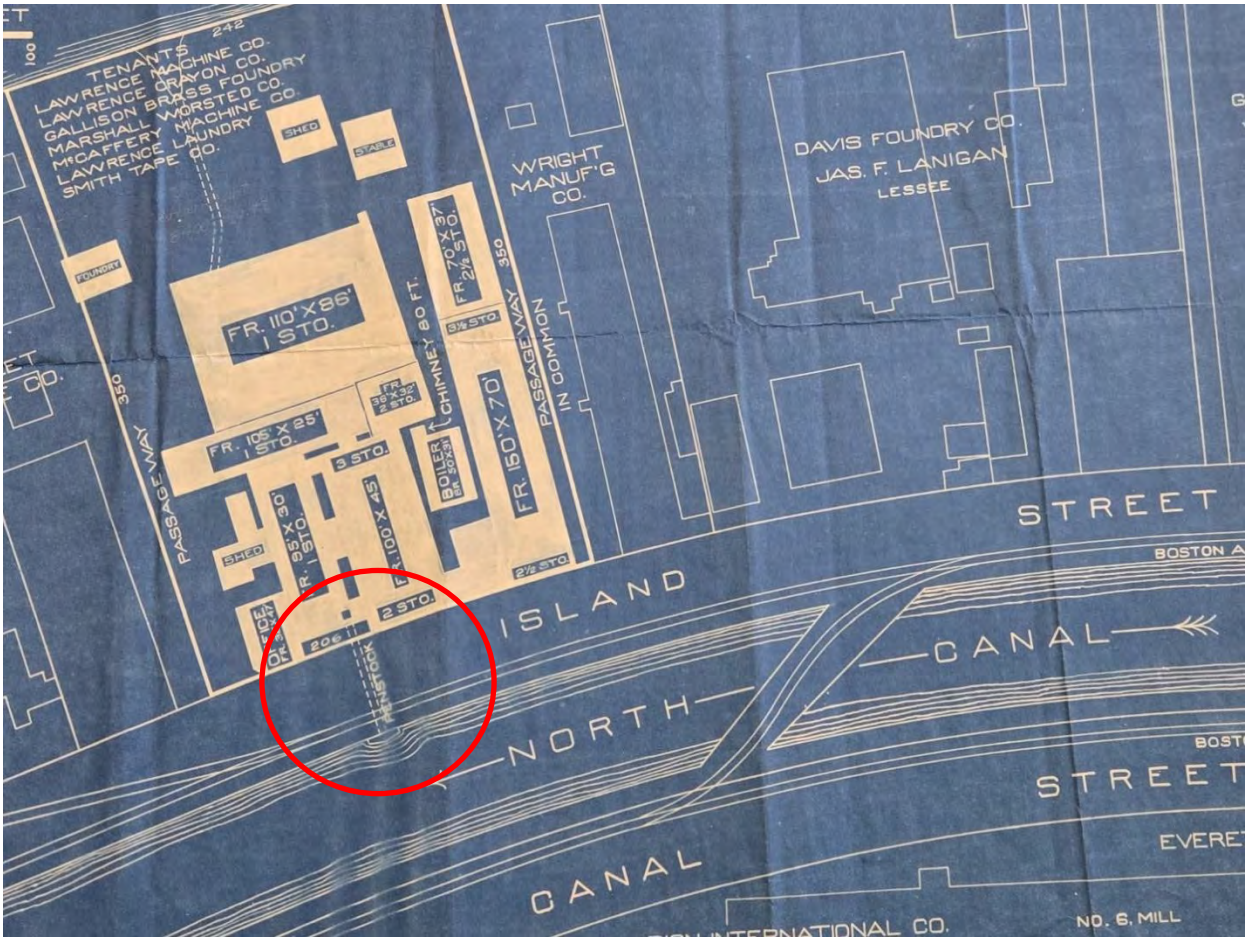
Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
SC8	No	Yes	No	
SC9	Yes; inner rack extant	No; penstock filled with concrete plug	Yes	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
SC10	Yes; inner rack partially extant	No; penstock filled with concrete plug	Yes	
SC11	Yes, both inner and outer racks partially extant	No; penstock filled with stone masonry plug	No	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
SC 12	Yes, both inner and outer racks partially extant	Yes	Yes	
SC14	No	Yes, gate head panel extant	Yes	

Resource ID	Trash Racks	Headgate(s)	Hoist(s)	Photograph
SC15	No	No, penstock filled with concrete plug	No	

Notes: ID = Identifier



Source: Image courtesy of Lawrence History Center.

Figure 6-35. Detail of Joseph Battles Mill (Resource NC8) showing headgate system in the North Canal and penstock to mill (red circle).

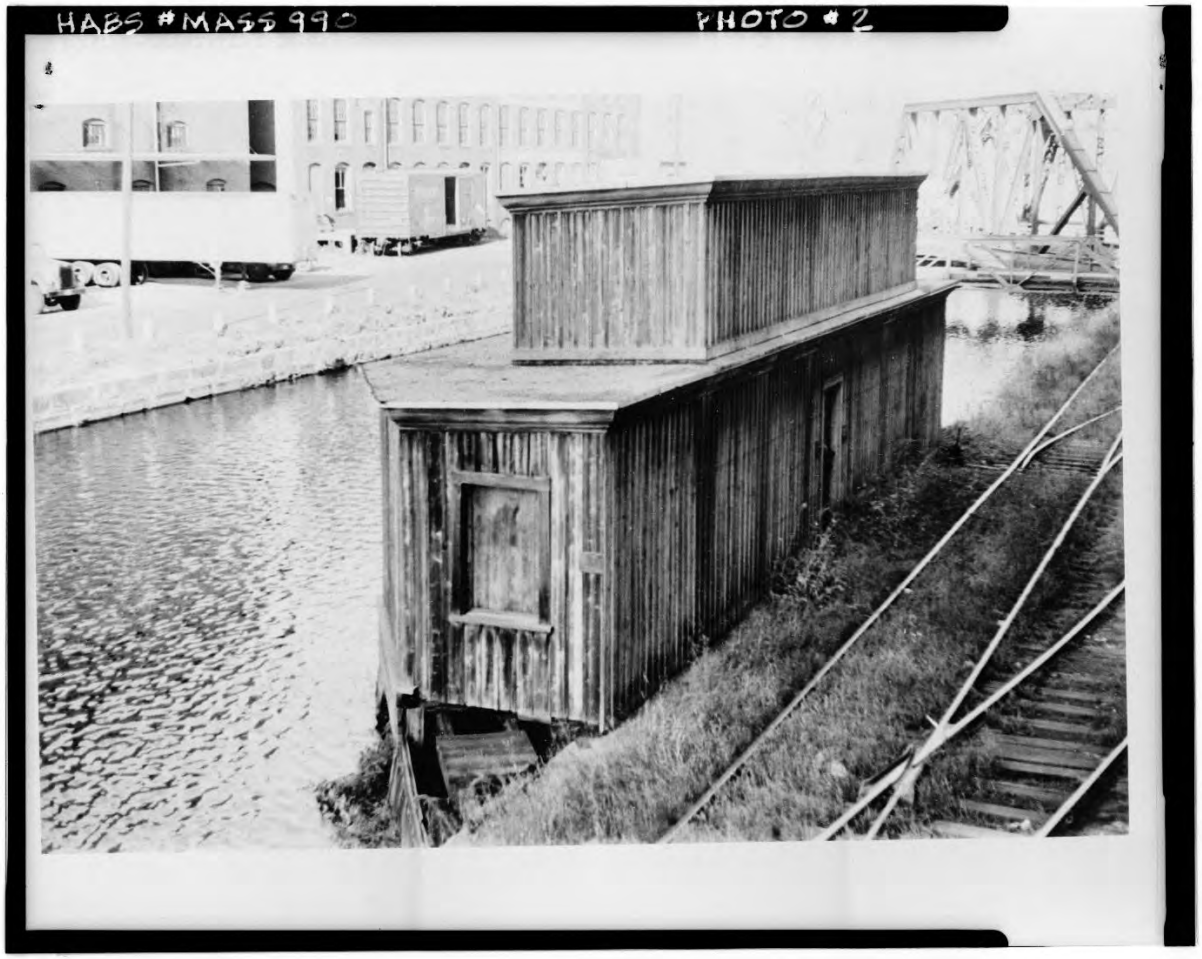
Figure 6-36. Detail of Resource SC7 hoist showing Essex “E” Machine Shop mark.

Figure 6-37. Resource SC5 outer and inner trash racks, view facing northwest.

Figure 6-38. Resource SC10 hoist, showing Essex "E" Machine Shop mark on the gear; view facing northeast.

Figure 6-39. Resource SC12 hoist, view facing northeast.

Figure 6-40. Resource SC14 hoist, view facing northeast.



Source: Image courtesy of the Library of Congress.

Figure 6-41. Undated photograph of Resource NC7 penstock headgate system enclosure, view facing northeast.

Source: Image courtesy of the Library of Congress.

Figure 6-42. Undated photograph of Resource NC7 penstock headgate system enclosure, view facing southeast.

6.3 NRHP Analysis

The identified waterpower equipment is best understood as a collection of components of a highly complex system comprising many individual structures and machine parts that worked in concert to manage the Merrimack River's raw waterpower. The identified waterpower equipment's historic significance is best understood in context of nineteenth century waterpower developments in New England and Essex's Lawrence Project. In these respects, although the waterpower equipment components are not specifically identified as contributing elements of the NRHP-listed North Canal Historic District nor the NRHP-eligible South Canal, they are inextricably part of, and essential to, these properties. As such, each component identified in this study is **recommended contributing** to its related NRHP-listed or recommended-eligible property.

As a class, the identified equipment is highly specialized equipment. However, in the context of Lowell and other New England waterpower projects, the Lawrence Project resources are part of the last vestiges of the nineteenth-century waterpower boom and represent the fully mature technology of the period. Regarding Criteria A and C, in the areas of Industry and Engineering, the Lawrence waterpower equipment neither innovated nor advanced the state of the art, nor did the equipment solve any unique engineering problems. Regarding Criterion B, although the equipment is associated with Charles Storer Storrow and illustrates his engineering design achievements, the small scale of the equipment belies the historic significance of the highly complex system the equipment was but a part of. Regarding Criterion D, the equipment, which was regularly repaired and replaced due to wear, is unlikely to yield information important in the history of engineering or waterpower. Each example of waterpower equipment identified in this study is **recommended not individually eligible** for the NRHP under Criteria A, B, C, and D.

7 Conclusion

In accordance with 18 CFR §5.11 of the Commission's regulations, in April 2024 Essex filed a RSP with the Commission in support of relicensing the Project. This report has been prepared with no variances from the RSP and SPD.

As a result of the October 2024 site visit, Essex identified historic-age waterpower equipment within the APE in the North Gatehouse, the North Canal Wasteway, the South Canal Gatehouse, the South Canal Wasteway, and along the walls of both canals. The identified equipment is **recommended contributing** to the associated NRHP-listed North Canal Historic District and NRHP-eligible South Canal, as applicable.

8 Literature Cited

Casjens, Laurel, Eugene Winter, William Lamb, and Stephen Williams. 1977. *Phase I/Reconnaissance - Phase II/Intensive Cultural Resource Survey for the Lawrence Hydroelectric Project, Lawrence, Massachusetts*. Peabody Museum of Archaeology and Ethnology Institute for Conservation Archaeology, Cambridge, Massachusetts.

Dengler, Eartha, Katherine Khalife, and Ken Skulski. 1995. *Images of America: Lawrence Massachusetts*. Arcadia Publishing, Dover, New Hampshire.

Dobbs, Judy, and Peter M. Molloy. 1975. *The North Canal*. Massachusetts Historical Commission, Boston, Massachusetts.

Ford, Peter A. 2000. “Father of the Whole Enterprise” Charles S. Storrow and the Making of Lawrence, Massachusetts, 1845–1860. *Massachusetts Historical Review* 2:76–117.

Hansen, Sarah, and Betsy Friedberg. 2009. *North Canal HD (2009 Technical Amendment and Boundary Increase)*. Massachusetts Historical Commission, Boston, Massachusetts.

Hay, Duncan Erroll. 1986. Building “The New City On The Merrimack”: The Essex Company And Its Role In The Creation Of Lawrence, Massachusetts. University of Delaware.

Hunter, Louis C. 1979. *A History of Industrial Power in the United States, 1780-1930*. Published for the Eleutherian Mills-Hagley Foundation by the University Press of Virginia, Charlottesville.

Molloy, Peter M. 1975. *North Canal*. Historic American Engineering Record.

Molloy, Peter M., and Marion J. Hyde. 1976. *The South Canal*. Historic American Engineering Record.

Molloy, Peter M., and Joseph R. Orfant. 1976. *Great Stone Dam*. Massachusetts Historical Commission, Boston, Massachusetts.

Myer, Mari L., and Carole Zellie. 1984. *North Canal Historic District*. Massachusetts Historical Commission, Boston, Massachusetts.

Appendix A – MACRIS & NRHP Documentation

This page is intentionally left blank.

Form No. 10-300 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

DATA SHEET

FOR NPS USE ONLY
RECEIVED NOV 1 1976
DATE ENTERED APR 13 1977

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC: Great Stone Dam

AND/OR COMMON: Essex Company Dam

2 LOCATION

STREET & NUMBER: Merrimack River, just west of the Mass. Route 28 crossing

__NOT FOR PUBLICATION

CITY, TOWN: Lawrence __ VICINITY OF

CONGRESSIONAL DISTRICT: 5th Massachusetts

STATE: Massachusetts CODE: 025 COUNTY: Essex CODE: 009

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	__PUBLIC	X OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	X PRIVATE	__UNOCCUPIED	__COMMERCIAL	__PARK
X STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	PUBLIC ACQUISITION	ACCESSIBLE	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	__YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	X INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME: Essex Company

STREET & NUMBER: 6 Essex Street

CITY, TOWN: Lawrence __ VICINITY OF

STATE: Massachusetts 01840

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC: Essex Company

STREET & NUMBER: 6 Essex Street

CITY, TOWN: Lawrence

STATE: Massachusetts

6 REPRESENTATION IN EXISTING SURVEYS

TITLE: Historic American Engineering Record
Inventory of the Historic Assets of the Commonwealth

DATE: 1975, 1976 __FEDERAL X STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS: Library of Congress, Massachusetts Historical Commission

CITY, TOWN: Washington, Boston

STATE: D.C., Mass.

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
X EXCELLENT	__DETERIORATED	__UNALTERED	X ORIGINAL SITE
__GOOD	__RUINS	X ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Great Stone Dam crosses the Merrimack River in Lawrence, Massachusetts. It is located west of the center of the city at the point where State Highway 28 crosses the Merrimack River.

The Essex Company Dam is an overflow weir the purpose of which is to impound the flow of the Merrimack River and to raise its water to a head sufficient for the generation of power. The dam is 900 feet in length and is gently curved upstream, with a center ordinate of 14.97 feet. The dam is skewed across the river, its southern end being about 200 feet further upstream than the northern end. The dam is anchored to the north and south mill islands by wing walls of random coursed, rough cut granite blocks, bricks and large pieces of granite rubble. The northern wing wall is 405 feet long and the southern wing wall is 324 feet. Thus the entire length of the dam is 1,629 feet. The overflow section of the dam varies in height from thirty to forty feet, with its average height being thirty-four feet. The dam is trapezoidal in profile, with a base of thirty-five feet and a top width of twelve and a half feet. The accompanying sketch provides additional information. The downstream side of the dam slopes at a rate of one foot in twelve, thus allowing the water to fall freely onto the blue quartzite ledge of the river bottom. The downstream face of the dam is of ashlar construction, consisting of quarry faced hammered granite headers and stretchers, set in hydraulic cement. The bottom row of headers was doweled to the bed of the river and set in a trench, eight feet wide and four feet deep, which was blasted for the entire overflow length of the weir. The crest stones of the dam are hammered granite blocks, all headers, which slope upstream at a grade of one foot in three for twelve feet. The upstream face of the dam slopes at a rate of forty-five degrees for twenty-two and a half feet, at which point the face drops vertically for ten feet to the bed of the river. All of the dam except for the crest stones and downstream face is constructed of large blocks of granite rubble, set in concrete and hydraulic cement. The entire upstream side of the dam is covered with a five foot layer of gravel and an earthen embankment, which slopes at a rate of one foot in six for one hundred and sixty feet upstream of the crest of the weir. The crest stones were initially drilled to accommodate about 250 wrought iron bars upon which flash boards were secured. Around 1865 the number of holes was doubled. The dam has no wasteways beyond the two canals which it supplies and its own spillway. The wing walls of the dam, on either side of the river, are fifteen feet higher than the crest. To comply with state law, the Essex Company originally constructed a wooden fishway at the south end of the dam. This fishway washed out periodically and was replaced with a concrete fishway in 1918. This fishway is still in place. Around 1914 the crest stones were reinforced by almost five hundred additional dowels as a precaution aginst the loss of crest stones which had occurred at the Pawtucket Dam in Lowell, a structure with a similar profile to the Essex Dam. At this time two crest stones were found to be cracked, and the cracks were spanned with steel plates. The dam has not been modified in any other way. The dam was begun in August of 1845 and the structure was completed in September of 1848. Its designer was Charles S. Storrow, the Treasurer and Chief Engineer of the Essex Company. The Construction Engineer was Charles Bigelow of the Essex Company.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	__ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
__1700-1799	__ART	X __ENGINEERING	__MUSIC	__THEATER
X 1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION
__1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES 1845-48 BUILDER/ARCHITECT Charles S. Storrow

STATEMENT OF SIGNIFICANCE

The Essex Company Dam was the first weir to cross a large American river with a height that exceeded ten feet. Since the overturning movement exerted upon a dam increases as the cube of its height, it required great engineering skill to design and construct such a structure. Moreoever, the dam had to be constructed to resist the huge freshets which periodically occurred on the Merrimack River. The average flow of the Merrimack is less than six thousand cubic feet per second. In the freshet of 1936 over two hundred thousand cubic feet per second were flowing over the dam's crest. Charles Storrow, a graduate of Harvard (number one in the Class of 1829) and the Ecole Nationale de Ponts et Chaussées (1833), had studied in the offices of Loammi Baldwin, Jr., and had toured the major engineering sites of France and Great Britian during the years 1830-1834. Storrow was the author of the first American treatise on hydraulic engineering (1835), and was a prominent railroad engineer (Boston and Lowell Railroad), and hydraulic engineer (Proprietors of Locks and Canals at Lowell). Storrow employed design principles which were followed by other dam builders for the remainder of the nineteenth century. Such renowned engineers as James Francis, Ezra Worthen, and Joseph Freeman modeled their own dams upon that of Storrow. Dam designers of more recent years have employed different techniques based upon the empirical data accumulated in the years since 1845. To this day the design of overflow weirs is largely a matter of good judgment upon the part of the engineer rather than such hard and fast rules as apply to the design of reservoir dams. The Essex Company Dam is of great significance because it embodies every known principle of weir design that was followed in the early nineteenth century in a state that has remained virtually unchanged since 1848. These design principles are its skewed, slightly curved form (to minimize overflow and to concentrate eddies in the center of the dam), its crest design (to facilitate the flow of chunks of ice), the massive earthern embankment (to prevent undermining of the dam), and the flush, uncurved spillway (to avoid the very considerable expense of building a curved spillway with ashlar masonry). A resultant force diagram of the dam shows that in every case from an empty mill pond to a water level of over 25 feet, the resultant force falls within the middle third of the profile, thus accounting for the dam's survival of floods and ice without the need for repair over the past 130 years. The use of hydraulic cement and concrete, each barrel of which was tested by an Essex Company Engineer, is also noteworthy. Only two other overflow weirs in the United States are older. The oldest is the Ascutney Dam at Windsor, Vermont (1836), which spans a very small stream, and which has been significantly modified. The second is the Old Croton Dam (1844), which was submerged in 1890 by the reservoir of its replacement, the New Croton River Dam.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Tenth Census of the United States, 1880, Vol. XVI, p.25.
Frizell, Joseph; Water Power, New York: 1890.
Wegmann, J.; Design of Dams, New York: 1908.
MSS.; Essex Company Records, Archives of the Merrimack Valley Textile Museum.
Essex Company; Plans and Drawings.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 2 acres

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	19	322540	4729660
B			
C			
D			

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE
Peter M. Molloy Merrimack Valley Textile Museum & Joseph R. Orfant, National Register Editor

ORGANIZATION
Massachusetts Historical Commission

DATE
25 October 1976

STREET & NUMBER
294 Washington Street

TELEPHONE
617-727-8470

CITY OR TOWN
Boston

STATE
Massachusetts

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE X LOCAL ___

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE Elizabeth Reid Amadon

TITLE Executive Director, Massachusetts Historical Commission DATE 10/26/76

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

CHIEF- ~~DIRECTOR~~, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION DATE 4/13/77

ATTEST: Charles A. Jennings DATE 3.18.77

KEEPER OF THE NATIONAL REGISTER

GPO 892-453

Great River Dam
Lawrence, Massachusetts
Sketch of Section

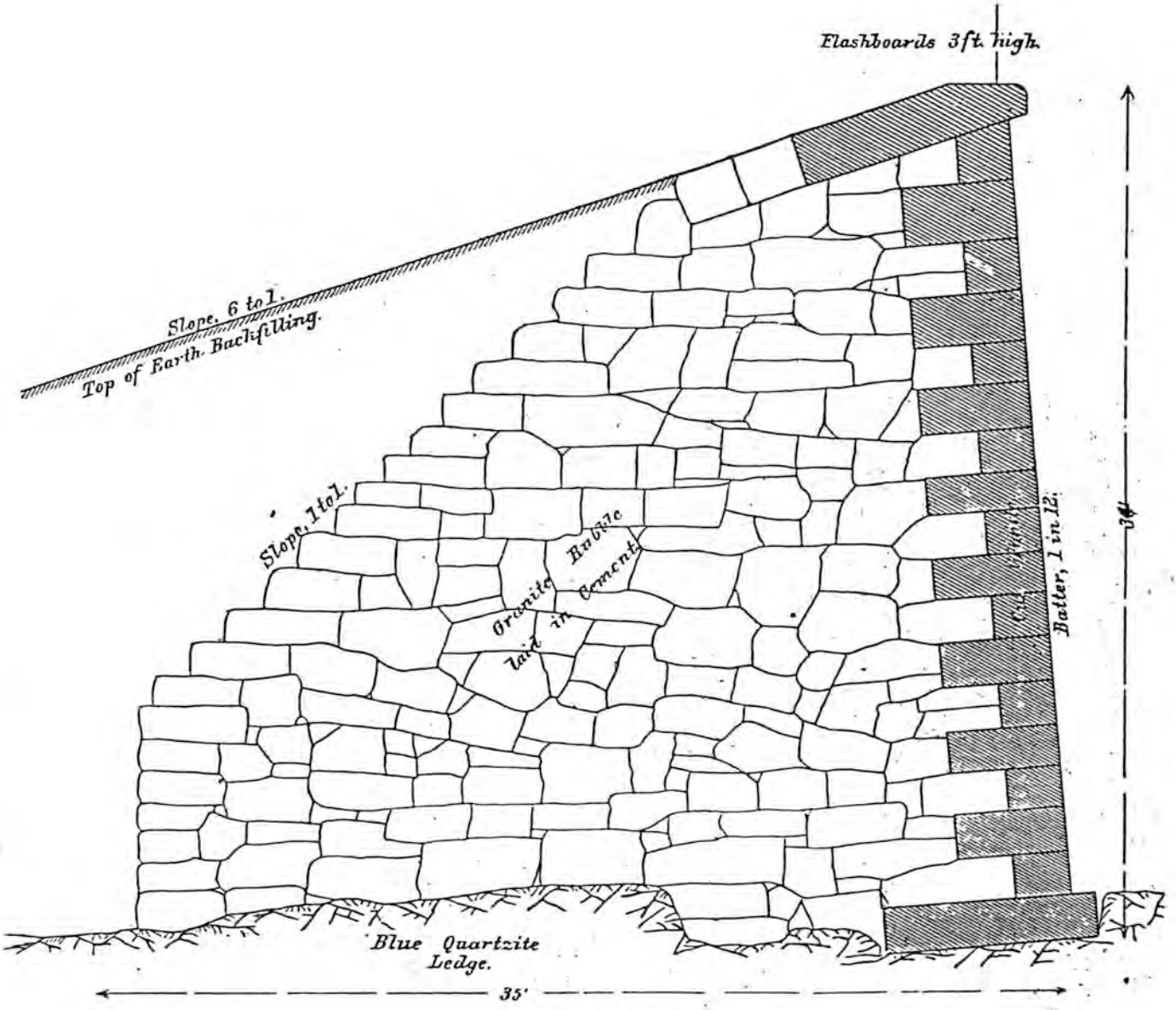
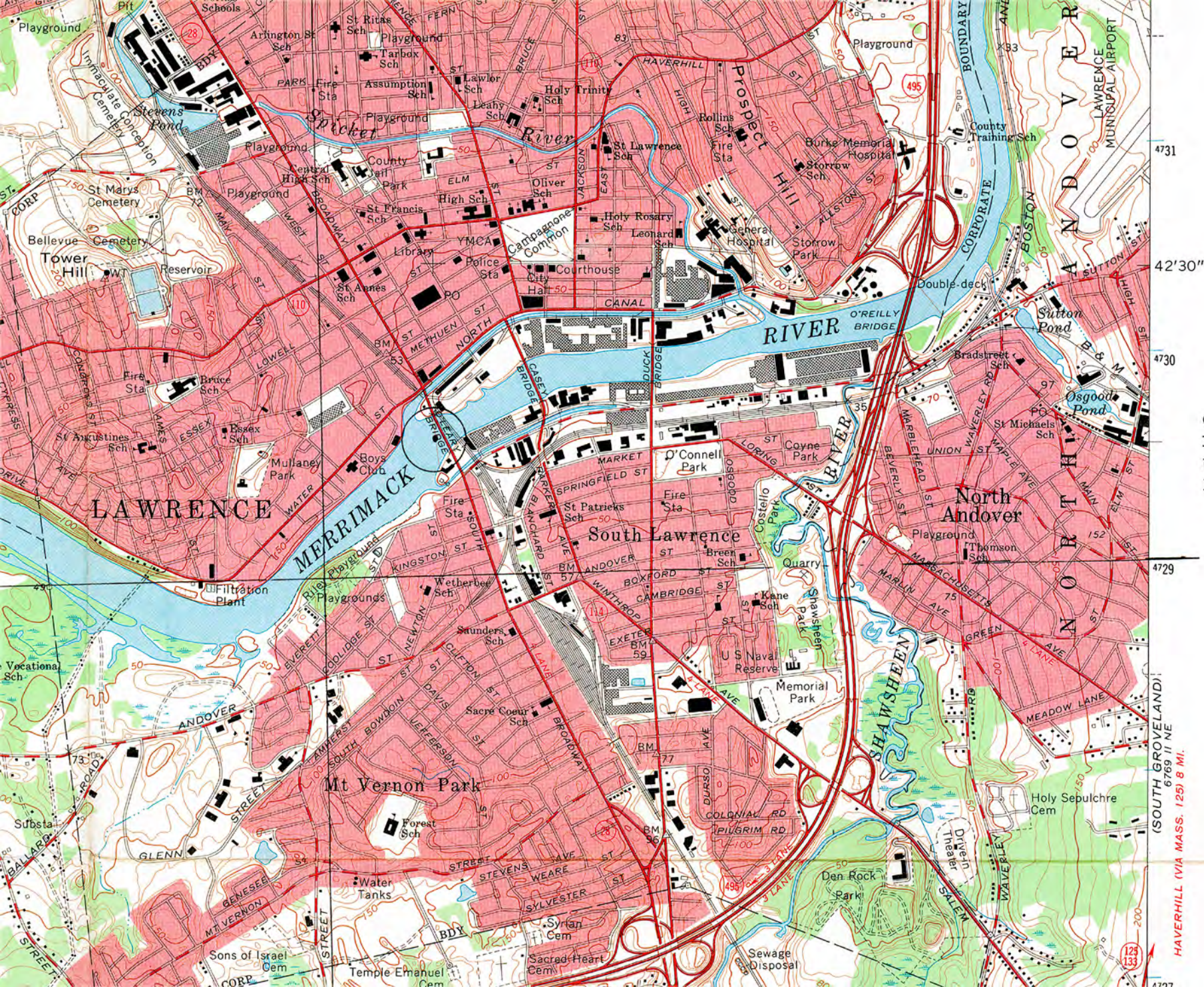


Fig. 5. SECTION OF DAM AT LAWRENCE, MASS.

FROM 1880 CENSUS, 'WATER POWER', VOL XVI.



Great Stone Dam
Lawrence, MA.
UTM Reference:
19/322540/4729660

1. Looking south across the Merrimack River showing the front of the dam and flasboards.
(Photo: Peter M. Molloy, Merrimack Valley Textile Museum, 1975)

Massachusetts Cultural Resource Information System
Scanned Record Cover Page

Inventory No:	LAW.907
Historic Name:	Great Stone Dam
Common Name:	
Address:	Broadway Across Merrimack River at Broadway
City/Town:	Lawrence
Village/Neighborhood:	Lawrence;
Local No:	
Year Constructed:	R 1848
Architect(s):	Storrow, Charles;
Use(s):	Other Engineering; Other Industrial;
Significance:	Engineering; Industry;
Area(s):	LAW.A, LAW.W
Designation(s):	Nat'l Register Individual Property (04/13/1977); Nat'l Register District (11/13/1984); Nat'l Register District (05/08/2009);
Building Materials:	
Demolished	No

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

LAW. 907

EXISTING SURVEYS | DATA | DWGS | PHOTOGRAPHS | STATES

CARD ONE

HAER INVENTORY

1. NAME OF STRUCTURE: Great Stone Dam

2. DATE: 1848

3. NATURE OF STRUCTURE: Dam

4. INDUSTRIAL CLASSIFICATION: 791

5. LOCATION: STREET & NUMBER: across Merrimack River at Broadway — CITY OR TOWN: Lawrence — COUNTY: Essex — STATE: MA

6. USGS QUAD MAP & UTM GRID REF.: Lawrence 19.322540. 472966

7. OWNER OF PROPERTY: The Essex Company, 6 Essex Street, Lawrence, MA 01845 — ADDRESS

8. CONDITION: [X] EXCELLENT [ ] GOOD [ ] FAIR [ ] DETERIORATED [ ] RUINS [ ] UNEXPOSED [ ] ALTERED [X] ACCESSIBLE TO PUBLIC

9. DESCRIPTION & BACKGROUND HISTORY: NUMBER OF STRUCTURES; DIMENSIONS; FABRIC; STRUCTURE & FORM; SURVIVING MACHINERY, FITTINGS AND EQUIPMENT; APPROX. AREA OF SITE; ALTERATIONS; PRESENT USE; ENGINEER/ ARCHITECT/DESIGNER; IMPORTANT EVENTS & INDIVIDUALS.

The Great Stone Dam was designed by Charles Storrow and constructed by Charles Bigelow, both of the Essex Company the organization which built the water power system and owned all of the land in what is now the city of Lawrence. The dam was built between November of 1845 and November of 1848. The railroad contracting firm of Gilmore and Carpenter performed the actual construction. The dam is sited at the foot of Bodwell's Falls, where the Merrimack River drops about five feet. The river drops about thirty feet between Hunt's Falls, downstream of Lowell, to Bodwell's Falls, a distance of almost 9 miles. The dam at Lawrence is thus built so as to pond up about thirty feet of water, with flash boards able to store several more feet. Initially a trench was blasted out of the river bed of igneous blue quartzite, and in the trench a row of quarry finished granite blocks, 8'x3', were laid in hydraulic cement in a row of headers. These blocks were dowelled to each other and the river bed. The face of the dam was constructed on this row of headers, in successive rows of headers and stretchers. All stone in the face of the dam are dressed granite blocks, set in hydraulic cement and dowelled to each other. The blocks were layered in successive rows of headers and stretchers. The height of the dam varies between thirty and forty-one feet, depending upon the (see Card Two)

10. PHOTOGRAPHS & SKETCH MAP ON REVERSE SIDE.

11. RELATED SOURCES OF INFORMATION: HISTORICAL REFERENCES (PUBLISHED ARTICLES, MANUSCRIPTS, REPORTS, DRAWINGS, PHOTO GRAPHIC RECORDS) CONTACTS: (NAMES & ADDRESSES OF ANYONE WITH EYE-WITNESS ACCOUNTS OR RELEVANT INFORMATION); TAPE RECORDINGS.

National Census of 1880, vol. XVI, Part I

MSS, Essex Company, Merrimack Valley Textile Museum, North Andover, MA 01845

12. DANGER OF DEMOLITION OR DAMAGE [ ] YES [X] NO — NATURE OF THREAT:

13. PRIORITY: 1

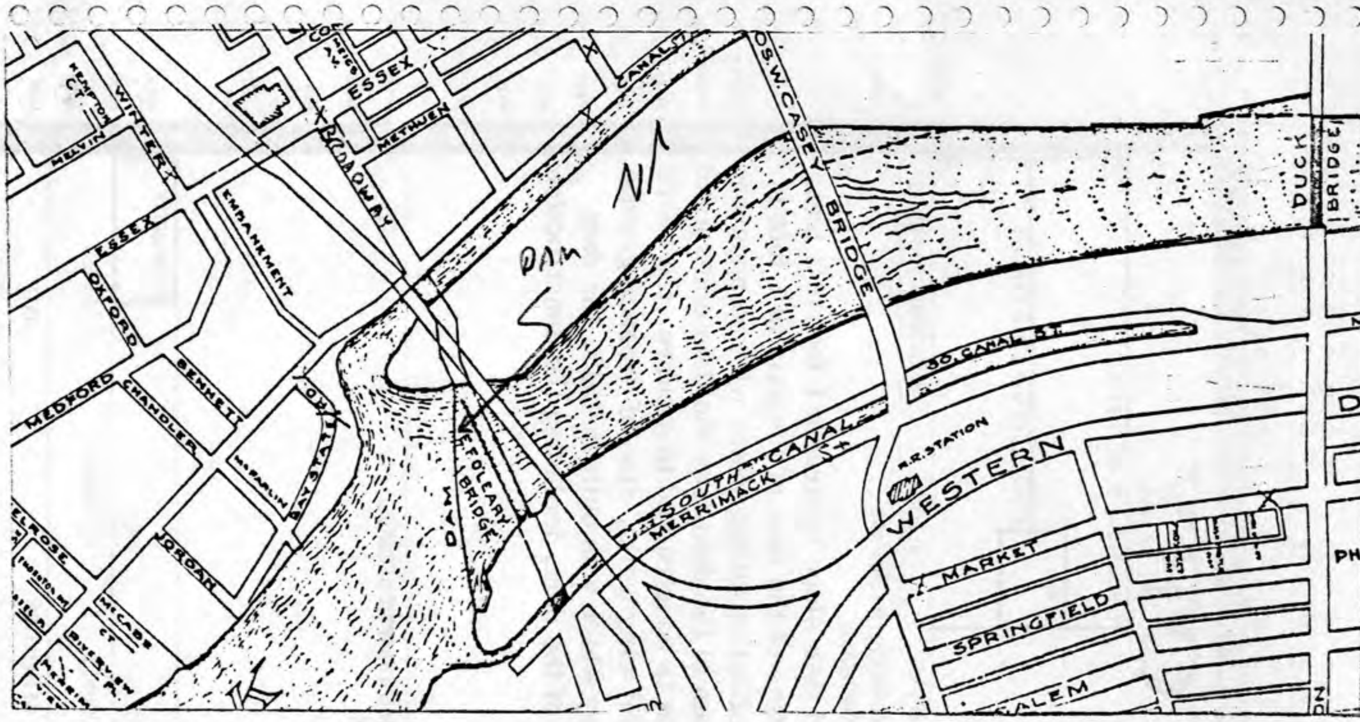
14. EXISTING SURVEYS AND DATES: [ ] NHL [ ] NR [ ] HAER [ ] HABS [ ] STATE [ ] COUNTY [ ] LOCAL [ ] OTHER

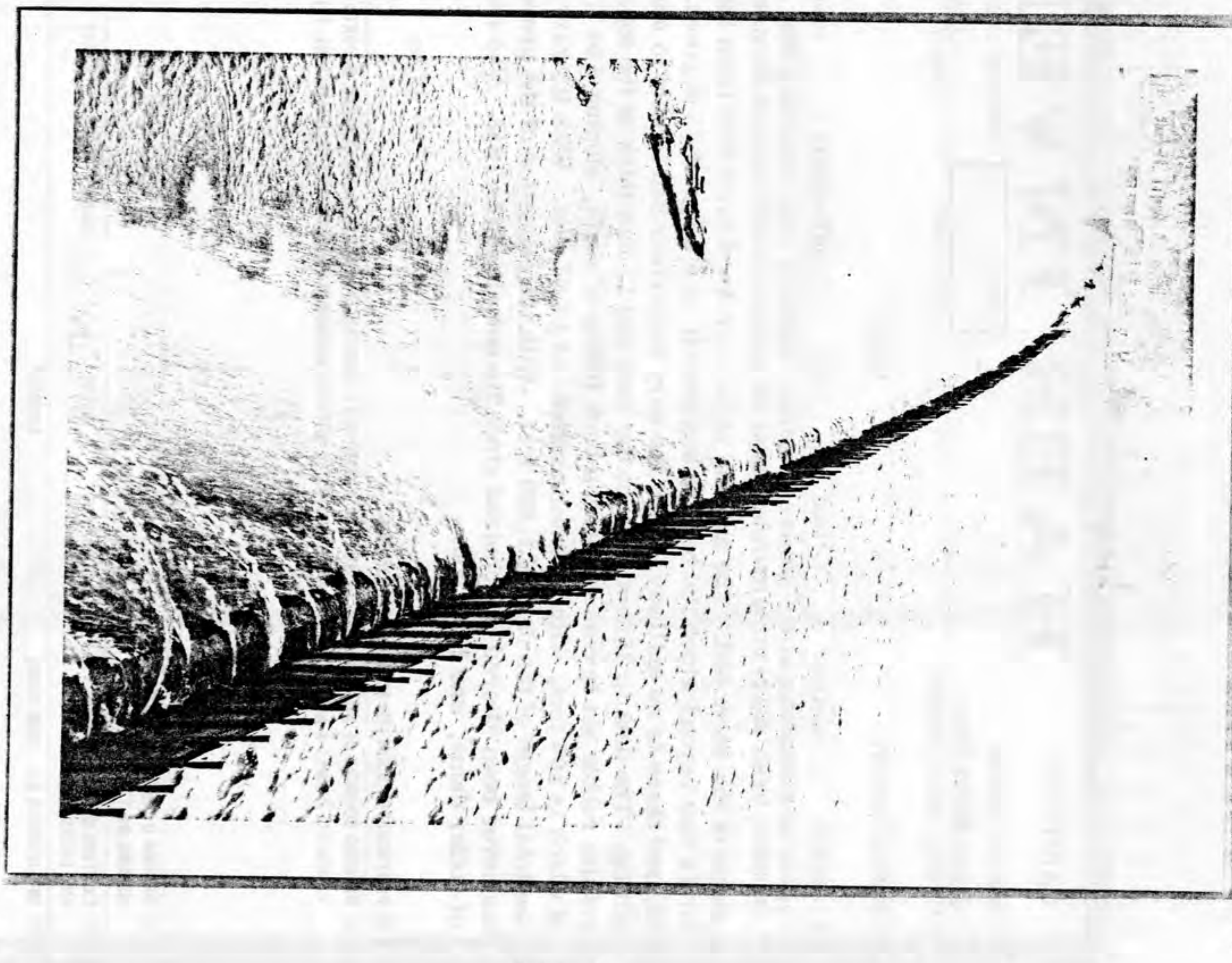
15. INVENTORIED BY: YOUR NAME: Peter M. Molloy — ADDRESS: 800 Mass. Ave., N. Andover, MA 01845 — AFFILIATION: Merrimack Valley Textile Museum — DATE: 11/1/75

PLEASE RETURN TO THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, WASHINGTON, DC 20240

DATES OF CONSTRUCTION | EXTRACTIVE INDUSTRIES (EXTRAC) | BULK PRODUCT INDUSTRIES (BULK) | MANUFACTURING INDUSTRIES (MFG) | UTILITIES (UTIL) | POWER SOURCES & PRIME MOVERS (PS & PM) | TRANSPORTATION (TRANS) | COMM | BRIDGES | BUILDING TECHNOLOGY (BLD TECH) | SPECIALIZED STRUCTURES (SPEC STRUC) | SUB-CLASSIFICATION

P306184


ESSEX
METHUEN
WINTER ST
MELVIN
BROADWAY
CANAL ST
O.S.W. CASEY BRIDGE
DUCK BRIDGE
DAM
EMBANKMENT
OXFORD
BENNETT
MEDFORD
CHANDLER
BAY STATE
JORDAN
MELROSE
McCABE CT
RIVERVIEW
SO. CANAL ST.
SOUTH CANAL ST
MERRIMACK
R.R. STATION
WESTERN
MARKET
SPRINGFIELD
SALEM



LAW.907

LAW.907

EXISTING SURVEYS: NR HAER HABS STATE COUNTY LOCAL OTHER DOD | DATA: FN HIST TECH ARCH TAPES | DWGS: HAER OTHER | PHOTOGRAPHS: FIELD SLIDES HIST SURVEY STEREO MOVIES LC | STATES: AL AK AR AZ CA CO CT DE FL DC GA HI ID IL IN IA KS KY LA ME MD MA MI MN MS MO MT NE NV NH NJ NM NY NC ND OH OK OR PA RI SC SD TN TX UT VT VA WA WV WI WY

DATES OF CONSTRUCTION: PRE 19th C; 1800 1809; 1810 1819; 1820 1829; 1830 1839; 1840 1849; 1850 1859; 1860 1869; 1870 1879; 1890 1899; 1900 1909; 1910 1919; 1920 1929; 1930 PRESENT

EXTRACTIVE INDUSTRIES (EXTRAC): 01 IRON; 02 COAL; 03 OIL; 04 MNRL; 05 NON-FERROUS; 06; 07; 08; 09

BULK PRODUCT INDUSTRIES (BULK): 10 AGRI; 11 BPGC; 12 CHEM; 13 FOOD; 14 METAL; 15 TEXT; 16 WOOD; 17; 18; 19; 20

SUB-CLASSIFICATION: 0; 1; 2; 3; 4; 5; 6; 7; 8; 9

SPECIALIZED STRUCTURES (SPEC STRUC): 93; 92; 91; SURVEY 90; MUSEUM 89; ADAPT 88; HOUS 87; P&ET 86; MATS 85; MATH 84; HEAT 83; CONST 82; HYDRA 81; TUNLS 80; DAM 79

BUILDING TECHNOLOGY (BLD TECH): 78; 77; 76; ANCIL 75; MECH 74; FENES 73; ROOF 72; FLOOR 71; FRAME 70; FOUND 69

CARD TWO

HAER INVENTORY

1. NAME OF STRUCTURE: Great Stone Dam
2. DATE
3. NATURE OF STRUCTURE
4. INDUSTRIAL CLASSIFICATION
5. LOCATION: STREET & NUMBER; CITY OR TOWN; COUNTY; STATE
6. USGS QUAD MAP & UTM GRID REF.
7. OWNER OF PROPERTY; ADDRESS
8. CONDITION: ☐ EXCELLENT ☐ GOOD ☐ FAIR ☐ DETERIORATED ☐ RUINS ☐ UNEXPOSED ☐ ALTERED ☐ ACCESSIBLE TO PUBLIC
9. DESCRIPTION & BACKGROUND HISTORY: NUMBER OF STRUCTURES; DIMENSIONS; FABRIC; STRUCTURE & FORM; SURVIVING MACHINERY, FITTINGS AND EQUIPMENT; APPROX. AREA OF SITE; ALTERATIONS; PRESENT USE; ENGINEER/ ARCHITECT/DESIGNER; IMPORTANT EVENTS & INDIVIDUALS.

shape of the river bed. The capping stones are level for 3 feet from the face and then slope upstream 1 foot in 3 feet, for 12 feet beyond which the bank is stepped off at a slope of 45 degrees. The batter of the face of the dam is 1 foot in 12, and there is no spillway, since the very hard river bed is able to absorb the effect of falling water with no apparent pitting. The dam is 35 feet thick at the base and 13 feet thick at the top. Upstream of the dam face the dam consists of granite rubble set in ~~cement~~ Concrete, with a back filling of earth, sloping 6 to 1. The dam is constructed in a curve, the chord of which is 900 feet, with a center ordinate of 14.97 feet. With its very substantial wing walls, also of dressed granite, the total length of the dam is 1,629 feet. With the exception of the present fishway which was built in 1917, the dam has never been altered or repaired since its completion in 1848. The entire cost of the dam, including the construction of coffer dams, was $250,000.

10. PHOTOGRAPHS & SKETCH MAP ON REVERSE SIDE.
11. RELATED SOURCES OF INFORMATION: HISTORICAL REFERENCES (PUBLISHED ARTICLES, MANUSCRIPTS, REPORTS, DRAWINGS, PHOTOGRAPHIC RECORDS) CONTACTS: (NAMES & ADDRESSES OF ANYONE WITH EYE-WITNESS ACCOUNTS OR RELEVANT INFORMATION); TAPE RECORDINGS.
12. DANGER OF DEMOLITION OR DAMAGE ☐ YES ☐ NO NATURE OF THREAT:
13. PRIORITY
14. EXISTING SURVEYS AND DATES: ☐ NHL ☐ NR ☐ HAER ☐ HABS ☐ STATE ☐ COUNTY ☐ LOCAL ☐ OTHER
15. INVENTORIED BY: YOUR NAME; ADDRESS; AFFILIATION; DATE

PLEASE RETURN TO THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, WASHINGTON, DC 20240

MANUFACTURING INDUSTRIES (MFG): MACH FABR TEQUIP INST GNFG

UTILITIES (UTIL): WATER SANI GAS ELEC

POWER SOURCES & PRIME MOVERS (PS & PM): MUSL WATER WHEEL WATER TURB WIND STEAM RECIP STEAM TURB INT COMB DIESEL ELEC

TRANSPORTATION (TRANS): RR ROAD CANAL MARINE AIR PIPE

COMM: T&T R&TV

BRIDGES: BEAM ARCH TRUSS SUSP AQUE TRES CANT MOVE

P30618X

Form No. 10-300 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC: The North Canal

AND/OR COMMON: same

2 LOCATION

STREET & NUMBER: Parallel to Canal Street — __NOT FOR PUBLICATION

CITY, TOWN: Lawrence — __ VICINITY OF

CONGRESSIONAL DISTRICT: Fifth

STATE: Massachusetts — CODE: 025

COUNTY: Essex — CODE: 009

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	__PUBLIC	X OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	X PRIVATE	__UNOCCUPIED	__COMMERCIAL	__PARK
X STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	X INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME: The Essex Company

STREET & NUMBER: 6 Essex Street

CITY, TOWN: Lawrence — __ VICINITY OF

STATE: Massachusetts 01840

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.: Essex County Registry of Deeds

STREET & NUMBER: 381 Common Law Avenue

CITY, TOWN: Lawrence

STATE: Massachusetts

6 REPRESENTATION IN EXISTING SURVEYS

TITLE: Inventory of Historic Assets of the Commonwealth

DATE: 1967 — __FEDERAL X STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS: Massachusetts Historical Commission

CITY, TOWN: Boston

STATE: Massachusetts 02108

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
__EXCELLENT	__DETERIORATED	__UNALTERED	X ORIGINAL SITE
x GOOD	__RUINS	X ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The North Canal lies 400 feet north of the Merrimack River and runs parallel to the Merrimack which flows from west to east through the city of Lawrence. To the north of the canal is a heavy concentration of industrial and commercial structures consisting of two- and three-story brick buildings. To the south is an island, artificially formed by the canal and the Merrimack River, on which are located groupings of mill buildings which grew up there as a result of their need for the power supplied by the canal. The North Canal was begun in August 1845 and was put into partial operation in March 1848. Final completion took place in August 1848.

The North Canal is 5300 feet long, and its width is 100 feet at its head and 60 feet at its end. It is four feet deep at the walls and twelve feet deep at the center. The canal bottom slopes one-half foot from headgate to wasteway to insure a uniform flow. The canal walls are made of undressed granite, partially rough-set, partially set in mortar. The bottom of the canal is covered with granite rubble and a mixture of hardened sand, clay, and gravel known as "puddle." Seepage is minimal.

At the head of the canal is a rectangular gatehouse of wood frame construction. Built in 1848, this simple building reflects the Greek Revival style in its gable end and corner pilaster details. At the gatehouse 24 headgates control the amount of water entering the six sluice-ways. A dozen headgates leading to the mills remain in situ. A wasteway at the end of the canal controls the amount of water allowed to remain in the canal. There is also a spillway at the eastern extremity of the North Canal. A single navigation lock at the head of the canal has been removed, but the lock walls remain. A set of three navigation locks at the end of the canal have been filled in. The canal is maintained by the Essex Company and is in good running order.

Water from the Merrimack River enters the upper part (western end) of the canal and is emptied into the Spicket River at a point about 100 yards north of the Spicket's junction with the Merrimack. The water is diverted into the canal by means of a granite dam which stretches obliquely across the Merrimack and is located at the western end of the canal.

Bounded by the North Canal, the "Great Stone Dam," the Merrimack River, and a portion of the Spicket River is an island of approximately 49 acres. This area was the site of all but one of the original mills built during the mid-nineteenth century. Each factory received its water power through a piping system known as penstocks which are still in existence. The penstocks ran underneath the mills from the canal to the river. The flow of water through the factory was regulated by a gate on the side of the canal.

To the south of the Merrimack River is the South Canal which was built in stages between 1870 and 1910. Originally the South Canal was three-quarters of a mile long, although in modern times it has been considerably shortened.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	__ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
__1700-1799	__ART	X ENGINEERING	__MUSIC	__THEATER
X 1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	X TRANSPORTATION
__1900-	__COMMUNICATIONS	X INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES 1845–1848 BUILDER/ARCHITECT Charles S. Storrow, James B. Francis and Charles Bigelow (engineers)

STATEMENT OF SIGNIFICANCE

The North Canal figured prominently in the founding of Lawrence and was responsible for the city's development as one of the leading textile manufacturing centers in the United States prior to World War I. The Essex Company, which founded Lawrence in 1847, selected the site for their new town because of its favorable topography for a canal. In 1822 the same company had founded Lowell and had built the textile mills in that city. Samuel and Abbott Lawrence, Patrick T. Jackson, Nathan Appleton, and other prominent manufacturers and investors saw that a power canal could be built at Lawrence which would equal the output of the entire network at Lowell.

The construction of the canal at Lawrence represented the latest state of the art in civil engineering techniques in North America as well as in Europe. With its carefully designed surface area, slope, bottom covering, and wasteway, the North Canal was a vast improvement over the canals which had been built at Lowell in the 1820's and 1830's.

Two of the nation's leading civil engineers designed the canal at Lawrence. The principal engineer (also Agent and Treasurer of the Essex Company) was Charles S. Storrow, author of the first American text on hydraulic engineering (1837). Storrow's design of the canal at Lawrence, using the latest refinements of European engineering, was a radical departure from earlier American hydraulic construction at Paterson, Lowell, and the Blackstone Valley. Assisting Storrow was James B. Francis, builder of the Northern Canal and dam at Lowell and designer of a revolutionary new water turbine. Some of Francis' famous hydraulic experiments at Lowell were made for the hydraulic works at Lawrence. The construction engineer for the Lawrence North Canal was Charles Bigelow, a graduate of West Point and former member of the Corps of Engineers. Bigelow was responsible for building much of Fort Independence in Boston Harbor and also designed several of the mills of Lawrence.

As testimony to the skill of these engineers, the dam and canal at Lawrence have never required more than minimum maintenance from 1848 to the present. No significant repairs have ever been necessary in either structure. The North Canal has in fact remained so effective that a recent study made by the Department of Public Works showed that if necessary it could supply a city nearly twice the size of Lawrence with energy.

Continued –

Form No. 10-300a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

Statement of Significance (Continued)

The North Canal supplied water to power virtually all of Lawrence's mills until the 1880's when the growing size of the mills necessitated the use of steam engines. The canal continued in full use, however, until the depression of the 1930's forced many mills to suspend operations. Most of the headgates and penstocks which supplied the mills are still in place and a few are still in use. State law required that the canal be navigable by barges, and Storrow designed a set of locks to accomplish this. In the 1920's the locks were filled in, making the only modification which has taken place at the canal.

The North Canal paralleled the Merrimack River, making it possible to design the city on a grid pattern centered on the canals. Boarding houses and mills lined the canal for its entire length. Shaded by elm trees, the North Canal was a favorite holiday promenade for citizens of Lawrence.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Department of the Interior, 10th Annual Census, (GPO, 1885), vol. XVI, Reports on the Water Power of the United States, Part I, pp. 25-30.

H. Wheatland, ed. Standard History of Essex County (Boston, 1878):Robert H. Tewksbury, "History of Lawrence," pp. 210-238.

Records of the Essex Company, 1844-1940. Manuscript housed at the Merrimack Valley Textile Museum, North Andover, Massachusetts.

Maps and drawings housed at the Essex Company, 6 Essex Street, Lawrence, Massachusetts

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY Approximately 10 acres

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	19	324090	4730810
B	19	324110	4729090
C	19	322100	4730180
D	19	323810	4729700

VERBAL BOUNDARY DESCRIPTION

E 19/322360/4729850

F 19/322970/4730300

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Judy Dobbs, National Register Editor, and Peter M. Molloy, Curator, Merrimack Valley Textile Museum

ORGANIZATION: Massachusetts Historical Commission

DATE: 25 June 1975

STREET & NUMBER: 40 Beacon Street

TELEPHONE: 617-727-8470

CITY OR TOWN: Boston

STATE: Massachusetts

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE X LOCAL ___

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE Elizabeth R. Amadon

TITLE Executive Director, Mass. Historical Commission

DATE 6/25/75

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

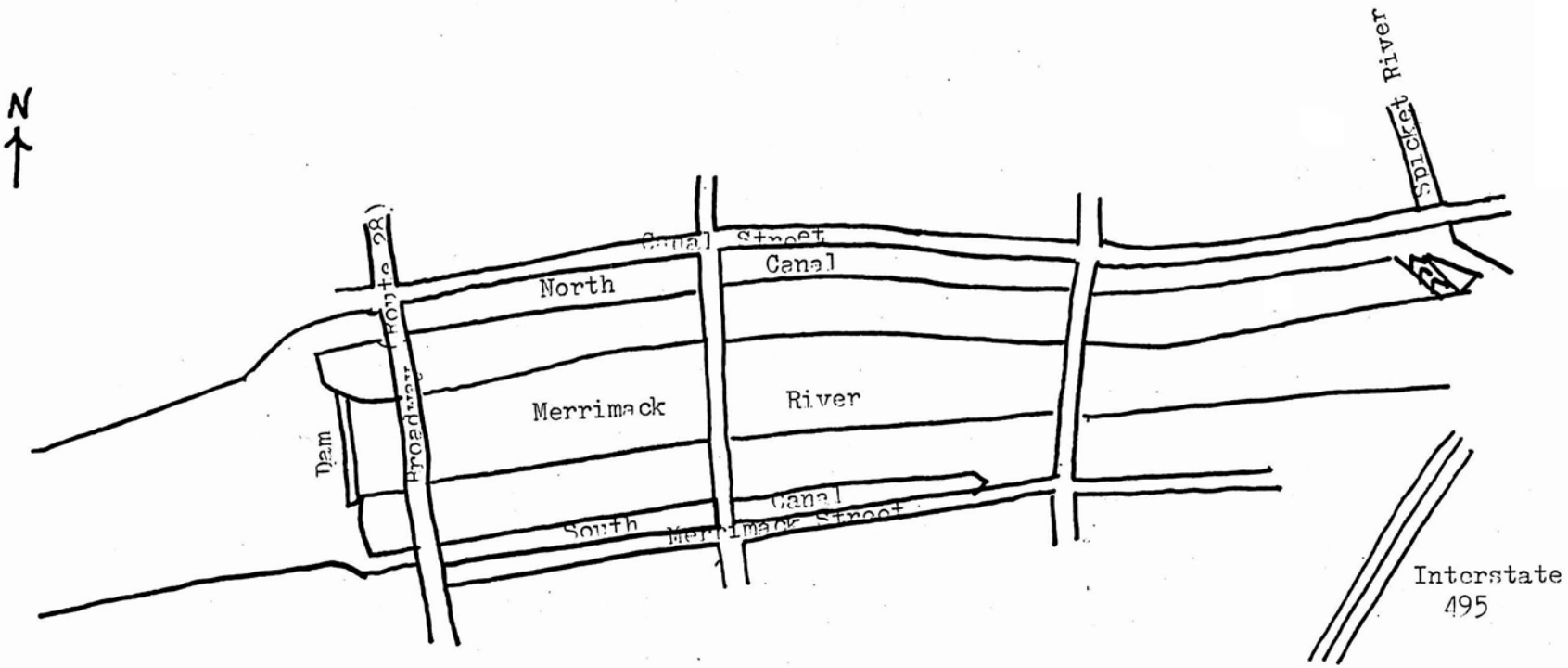
DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

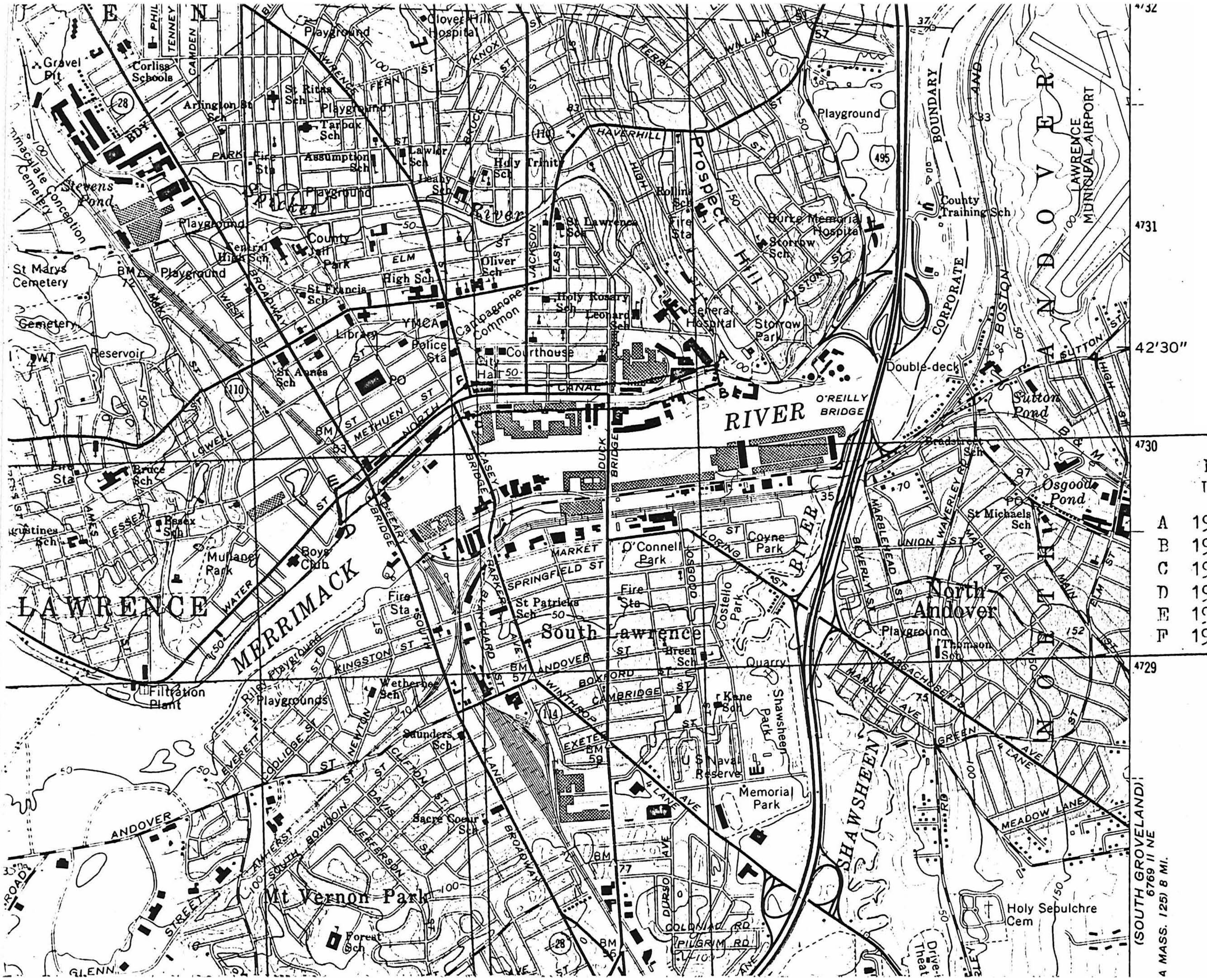
ATTEST: DATE

KEEPER OF THE NATIONAL REGISTER

GPO 888-445



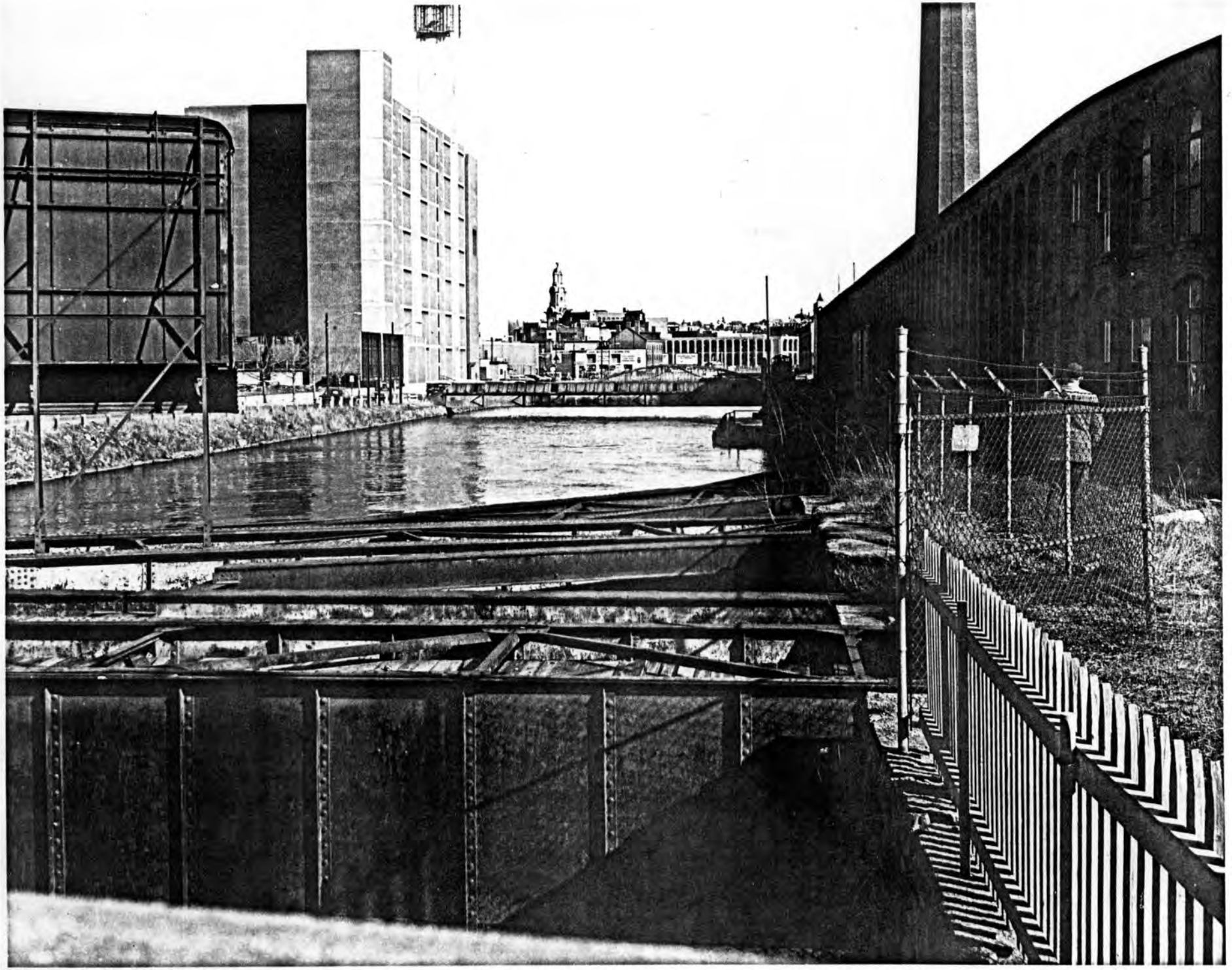
Location of the NORTH CANAL, Lawrence, Massachusetts



Lawrence, North Canal
UTM reference:

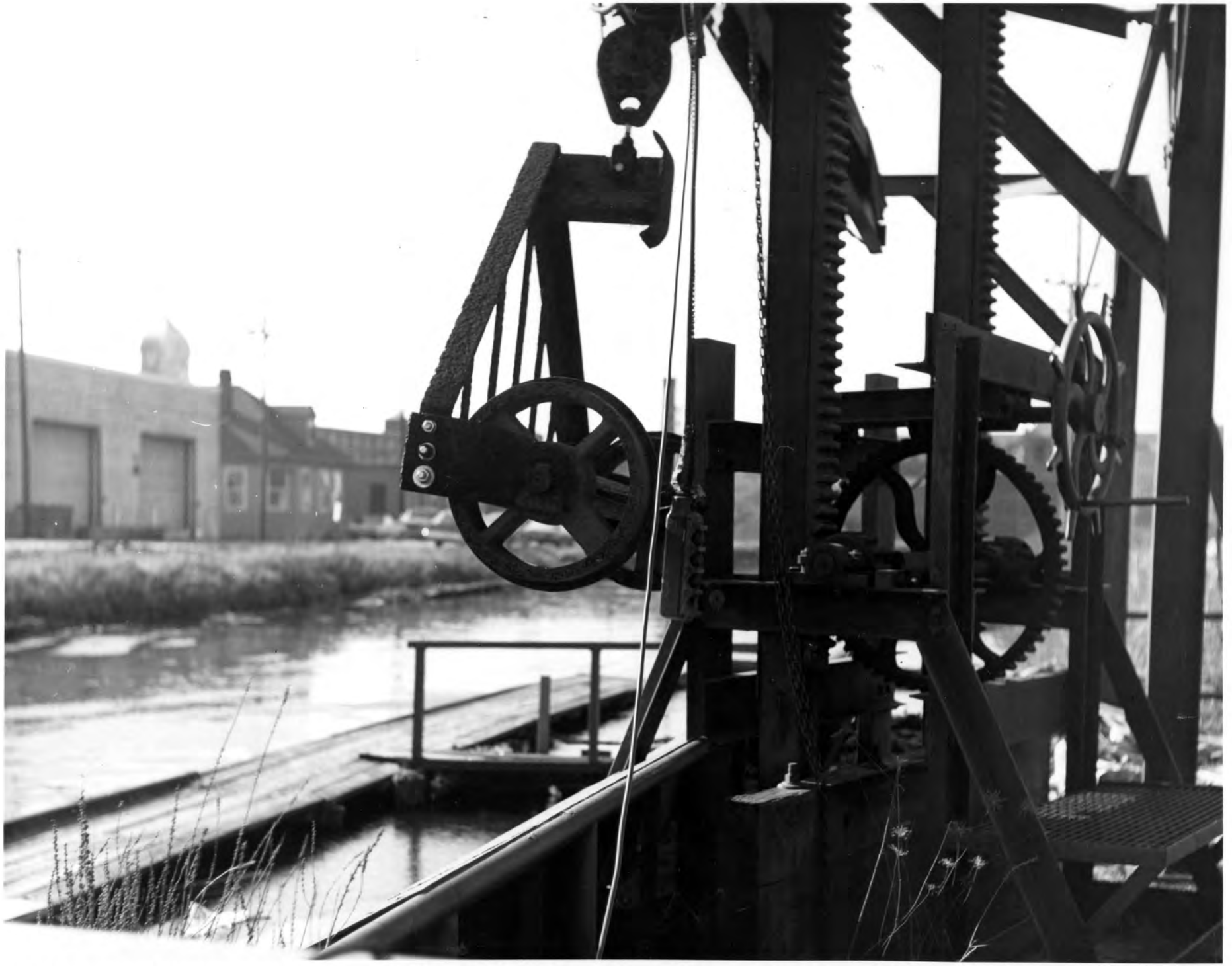
A 19/324090/4730380
B 19/324110/4730290
C 19/322100/4730180
D 19/322380/4729700
E 19/322360/4729850
F 19/322970/4730300

1. View of gatehouse from up river. Direction: southeast. (Photograph: Peter Malloy, Merrimack Valley Textile Museum, 1 February 1975)

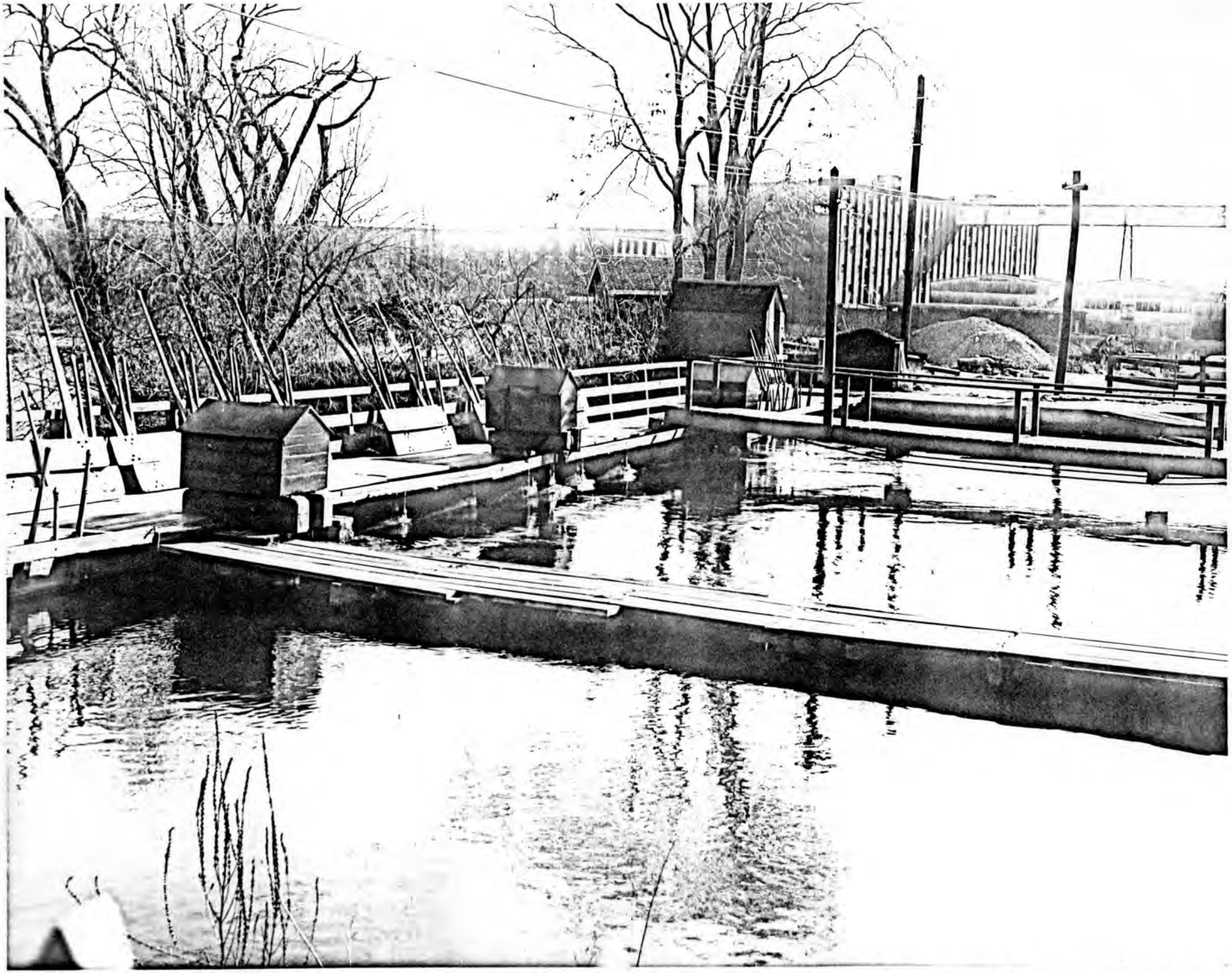


2. View of upper canal from gatehouse. Direction: east. (Photocopy from an original photograph by Peter Malloy, Merrimack Valley Textile Museum, 1 February 1975)

3. View of middle section of canal, in front of former Washington Mill. Direction: west.(Photocopy from an original photograph by Peter Malloy, Merrimack Valley Textile Museum, 1 February 1975)



4. View of headgate at entrance to wasteway.(Photograph: Peter Malloy, Merrimack Valley Textile Museum, 1 February 1975)



5. View of wasteway. Direction: southeast.(Photocopy from an original photograph by Peter Malloy, Merrimack Valley Textile Museum, 1 February 1975)

6. View of spillway of wasteway. Direction: southwest.(Photograph: Peter Malloy, Merrimack Valley Textile Museum, 1 February 1975)

Form No 10-301
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY MAP FORM

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- ENCLOSE WITH MAP

1 NAME

HISTORIC North Canal

AND/OR COMMON Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 MAP REFERENCE

SOURCE USGS

SCALE 1:24000 DATE 1966

4 REQUIREMENTS

TO BE INCLUDED ON ALL MAPS
1. PROPERTY BOUNDARIES
2. NORTH ARROW
3. UTM REFERENCES

INT: 3464-75

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY MAP FORM

RECEIVED

DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- ENCLOSE WITH MAP

1 NAME

HISTORIC North Canal

AND/OR COMMON Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 MAP REFERENCE

SOURCE Sketch Map

SCALE Not to scale DATE June 1975

4 REQUIREMENTS

TO BE INCLUDED ON ALL MAPS
1. PROPERTY BOUNDARIES
2. NORTH ARROW
3. UTM REFERENCES

INT: 3464-75

Form No 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY

RECEIVED

DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC
The North Canal

AND/OR COMMON
Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 PHOTO REFERENCE

PHOTO CREDIT Peter M. Molloy DATE OF PHOTO 1 February 1975

NEGATIVE FILED AT Merrimack Valley Textile Museum
North Andover, Massachusetts

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 1

View of gatehouse from upriver
Direction: southeast

NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC North Canal

AND/OR COMMON
Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 PHOTO REFERENCE

PHOTO CREDIT Peter M. Molloy DATE OF PHOTO 1 February 1975

NEGATIVE FILED AT Merrimack Valley Textile Museum
North Andover, Massachusetts

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 2

View of upper canal from gatehouse
Direction: East

Form No. 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC North Canal

AND/OR COMMON Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 PHOTO REFERENCE

PHOTO CREDIT Peter M. Molloy DATE OF PHOTO 1 February 1975

NEGATIVE FILED AT Merrimack Valley Textile Museum
North Andover, Massachusetts

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 3

View of middle section of canal, in front of former Washington Mill
Direction: West

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC North Canal

AND/OR COMMON Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 PHOTO REFERENCE

PHOTO CREDIT Peter M. Molloy DATE OF PHOTO 1 February 1975

NEGATIVE FILED AT Merrimack Valley Textile Museum
North Andover, Massachusetts

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 4

View of headgate at entrance to wasteway

Form No. 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC North Canal

AND/OR COMMON Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 PHOTO REFERENCE

PHOTO CREDIT Peter M. Molloy DATE OF PHOTO 1 February 1975

NEGATIVE FILED AT Merrimack Valley Textile Museum
North Andover, Massachusetts

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 5

View of wasteway
Direction: Southeast

NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC North Canal

AND/OR COMMON Same

2 LOCATION

CITY, TOWN Lawrence ___VICINITY OF COUNTY Essex STATE MA

3 PHOTO REFERENCE

PHOTO CREDIT Peter M. Molloy DATE OF PHOTO 1 February 1975

NEGATIVE FILED AT Merrimack Valley Textile Museum
North Andover, Massachusetts

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 6

View of spillway of wasteway
Direction: Southwest

NPS Form 10-900
(Rev. 10-90)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name North Canal HD (2009 Technical Amendment and Boundary Increase)

other names/site number Morehouse Bakery Building

2. Location

street & number roughly bounded by the Merrimack and Spicket rivers, North Canal, and Broadway ☐ not for publication

city or town Lawrence ☐ vicinity

state Massachusetts code MA county Essex code 009 zip code 01840

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this ☑ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☑ meets ☐ does not meet the National Register Criteria. I recommend that this property be considered significant ☑ nationally ☑ statewide ☑ locally. (☐ See continuation sheet for additional comments.)

Brona Simon March 23, 2009

Signature of certifying official/Title — Brona Simon, SHPO — Date

Massachusetts Historical Commission

State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional Comments.)

Signature of certifying official/Title — Date

State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is:

- ☐ entered in the National Register
  - ☐ See continuation sheet.
- ☐ determined eligible for the National Register
  - ☐ See continuation sheet.
- ☐ determined not eligible for the National Register
- ☐ removed from the National Register
- ☐ other (explain): _____

Signature of the Keeper — Date of Action

5. Classification

Ownership of Property
(Check as many boxes as apply)

- x private
- x public-local
- _ public-State
- x public-Federal

(Check only one box)

- _ building(s)
- x district
- _ site
- _ structure
- _ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
44	21	building
		sites
19	2	structures
		objects
63	23	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register Great Stone Dam, 1977

70 - North Canal HD 1984, North Canal, 1975

6. Function or Use

Historic Functions
(Enter categories from instructions)

COMMERCE/TRADE
EDUCATION
TRANSPORTATION
INDUSTRY/PROCESSING/EXTRACTION

Current Functions
(Enter categories from instructions)

DOMESTIC
COMMERCE/TRADE
SOCIAL
RECREATION and CULTURE
TRANSPORTATION
INDUSTRY/PROCESSING/EXTRACTION
LANDSCAPE
VACANT

7. Description

Architectural Classification
(Enter categories from instructions)

Greek Revival, Late Victorian, Italianate, Second Empire, Romanesque, Mixed. Commercial style

Materials
(Enter categories from instructions)

foundation Brick, Granite
walls Brick, Shingle
roof Asphalt, Synthetics, Slate
other Steel, Concrete

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

x **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

_ **B** Property is associated with the lives of persons significant in our past.

x **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

_ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

_ **A** owned by religious institution or used for religious purposes.

_ **B** removed from its original location.

_ **C** a birthplace or grave.

_ **D** a cemetery.

_ **E** a reconstructed building, object, or structure.

_ **F** a commemorative property.

_ **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

ARCHITECTURE
ECONOMICS
COMMUNITY PLANNING & DEVELOPMENT
ENGINEERING
ETHNIC HERITAGE
INDUSTRY
SOCIAL HISTORY

Period of Significance

1845-1959

Significant Dates

N/A

Significant Person
(Complete if Criterion B is marked above)

N/A

Cultural Affiliation

N/A

Architect/Builder

Charles Bigelow; Charles Storrow; Gilmore Carpenter;
George Moffette, Jr.; Thomas W.H. Moseley; (cont.)

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS): HPCA #18072

_ preliminary determination of individual listing (36 CFR 67) has been requested
_ previously listed in the National Register
_ previously determined eligible by the National Register
_ designated a National Historic Landmark
_ recorded by Historic American Buildings Survey #_____
_ recorded by Historic American Engineering Record #_____

Primary location of additional data:

_ State Historic Preservation Office
_ Other State agency
_ Federal agency
_ Local government
_ University
_ Other

Name of repository:

10. Geographical Data

Acreage of Property 60 acres

UTM References See continuation sheet.
(Place additional UTM references on a continuation sheet)

1.	19	323400	4730040	3.	19	324200	4730280
	Zone	Easting	Northing		Zone	Easting	Northing
2.	19	323600	4730540	4.	19	322420	4729860
	Zone	Easting	Northing		Zone	Easting	Northing

_ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Sarah Hansen, Architectural Heritage Foundation, with Betsy Friedberg, NR Director, MHC

organization Massachusetts Historical Commission date March 2009

street & number 220 Morrissey Boulevard telephone 617-727-8470

city or town Boston state MA zip code 02125

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps
A **USGS map** (7.5 or 15 minute series) indicating the property's location.
A **sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs
Representative **black and white photographs** of the property.

Additional items (Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name Morehouse Bakery Building LLC c/o Architectural Heritage Foundation

street & number 45 School Street telephone

city or town Boston state MA zip code 02108

Portions redacted

DESCRIPTION

The purpose of this nomination is to expand the boundary of the 1984 National Register nomination of the North Canal Historic District to include the Morehouse Bakery and to bring the information on the previously listed buildings up to date. The technical amendment portion of the nomination integrates new information and changes into the text of the original nomination. A section on the Morehouse Bakery has been added at the end of sections 7 and 8. Two structures—the **North Canal** and the **Great Stone Dam** - were individually listed in the National Register of Historic Places in 1975 and 1977, respectively. The period of significance has been expanded to 1959 to incorporate resources that have become contributing properties in the last 50 years. The district continues to retain integrity and to fulfill criteria A and C at the local, state, and national levels of significance. The Morehouse Bakery contributes to the district's significance.

The North Canal Historic District encompasses a mile-long, 60-acre tract of buildings, streets, bridges, hydraulic structures, and a canal, all developed starting in 1845 with the construction of the North Canal locks and wasteways. It was the industrial heart of a new manufacturing city intended to accommodate 30,000 people inhabiting 3,000 acres on the north side of the river—one of the largest and best-planned projects of its kind ever undertaken in America at that time. The district contains 63 contributing resources, most of which are commercial or industrial buildings; several mills have been rehabilitated for use as housing. The district has 23 noncontributing resources. Some parcels have been redeveloped and others remain vacant. Vacant lots are listed on the accompanying data sheet as V in the resource column and are not counted in this technical amendment.

Over the decades, until the 1920s, the district's built environment evolved steadily with additions, removals, renovations, and new construction centered on manufacturing, storage, and distribution buildings, as well as scientific laboratories and water treatment facilities. Between 1950 and the late 1990s, as the intensity of usage diminished, several buildings were demolished. Since the North Canal Historic District was listed in 1984, two new buildings have been constructed within its boundaries: a large four-story parking garage (**Museum Square Garage,** Map 24-I, 365 Canal Street) and a large three-story office building (**Fenton Judicial Center**, Map 24, 361 Canal Street). Both were built in 1994-1995 to the designs of architects Andrea Leers and Jane Weinzapfel. In addition, **Lawrence Heritage State Park** (Map 34) was created in 1985 and a major renovation of **Washington Mills Building No. 1** (Map 27) was completed in 2007.

Until 1845, what is now the historic district was riverbank farmland in the town of Methuen. It was first reconfigured and built out (some of it on dredged "new" land) according to the plans of the property owner and developer—the Boston-based Essex Company—whose partners envisioned a new industrial city that would feature large brick textile factories powered by water from a new canal, streets, bridges, and residential structures. From 1845 forward, the district was the focus of construction that was driven by consistent design control and a unified social and aesthetic vision, carried out by Charles S. Storrow on behalf of the Essex Company.

The **North Canal** (1848, Map 1), running parallel to the Merrimack River, was the original source of mechanical power and was the anchor for the new city and its main streets. About a block north of the district are the retail and office buildings of Essex Street; at the western end is Broadway; and near the eastern edge are Prospect Street and the Spicket River, a tributary of the Merrimack. Canal and Island streets run along portions of the canal, and other roads and railroad tracks and spurs run through the district. Canal Street was both residential and industrial: double rows of elms once rose over its boarding houses and mills.

(continued)

The period of significance for the amended historic district runs from 1845 to 1959. The last phase of mill construction occurred in the 1920s. Together, the buildings of the district present a chronology of the development of industrial architectural styles and technological advances. The earliest industrial buildings are gable-roofed structures of thick-coursed granite rubble; the latest are flat-roofed and built of fireproof reinforced concrete with acres of floor space designed for dozens of huge looms. While most buildings in the district are relatively unaltered and in fair to good condition, additions or enclosures of corrugated metal or frame construction are common.

The district's buildings were used for the manufacture of cloth (cotton, woolen, and duck), paper, baked goods, locomotives, and mill machinery and equipment. The first power source, the **Great Stone Dam** (1848, Map 2), is intact, and the canal's penstocks and raceways are still in place. Although the mill sites were rebuilt continually, later buildings and additions have neither destroyed the relationships of the mills to the canal nor supplanted good examples of architecture from each historic phase within the district. Impressive changes in scale—from boardinghouses to large factories—are highly visible and not obscured by infill building, affording good views of the buildings along the North Canal from the **Broadway Bridge** (now Edward O'Leary Bridge, Map 72) and the **Union Street (Duck) Bridge** (Map 54). Among advances evident in mill design are the change from water to steam power, the introduction of wide looms, alterations required by fire insurance companies, ventilation and humidification systems, and the introduction of bathrooms, electricity, and reinforced concrete.

Bridges

Within the North Canal Historic District, thirteen bridges cross the North Canal and the Merrimack River: eight metal-truss bridges, three concrete or steel-beam bridges, one stone arch, and one open-spandrel concrete arch. The eight truss bridges are of varied truss types, including some experiments in patented truss design, the Moseley and lenticular trusses. The bridges span the transition from pin-connected to the riveted construction of the late 1880s. Contrasting with the pin-connected bridges is the 1887 **Union (Duck) Bridge** (Map 54), designed by the civil engineer George L. Vose (1831-1910). Of the many bridges fabricated by the Boston Bridge Works, this five-span Warren-truss design is one of the earliest to replace pinned connections with riveted gusset plates and flanges.

Of the 20th-century bridges in the district, the most significant is the 1,500-foot, open-spandrel, concrete-arch **Central Bridge** (now Joseph W. Casey Bridge, Map 18), which was built across the Merrimack in 1918. Designed by New York consulting engineer Benjamin H. Davis (1883-1927), this is one of only eight open-spandrel examples in the state. Its original parapet walls and 26 lamp standards were removed in 1972.

The following description of representative buildings and other resources is organized geographically from west to east, as the Merrimack River flows.

THE UPPER ISLAND: Broadway to Amesbury Street

At the Upper Island, between the **Broadway Bridge** (now O'Leary Bridge, Map 72) and **Central Bridge** (now Casey Bridge, Map 18), are the northerly footings of the **Great Stone Dam** (Map 2) and portions of two large mill complexes

(continued)

that form a nearly continuous brick façade along the southern edge of the canal (Map 4 and 9). The **Pacific Mills Cotton Weave Shed and Office** (Map 4) building incorporates a smokestack that has become a landmark of the area. Running parallel to the Merrimack River, the **North Canal** (Map 1) was completed in 1848. It is 5,330 feet in length and ranges in width from 100 feet at the **gatehouse** (Map 2-I) to 60 feet at the Spicket wasteway, where it empties. Water enters the canal from the Essex Company millpond above the dam. The canal is 12 feet deep at the head and 13 feet at the wasteway. In section, the canal is trapezoidal, with 4-foot retaining walls of random coursed granite blocks along its full length. The granite rubble bottom is sealed with clay puddle. Several mills continue to use the canal's water, which delivers an average of 4,000 cubic feet of water per second. Running parallel to the canal and 80 feet to the south is a line of sheet pilings. A navigation lock at the head of the canal has been removed. A set of three navigation locks at the end of the canal has been filled in.

The **Great Stone Dam** (Map 2) was completed in 1848 at Bodwell's Falls, where the Merrimack drops five feet. Footed on a bluestone bedrock ridge, the dam was built to pond up 30 feet of water. The dam face is constructed on a trench of huge granite blocks, eight feet by eighteen feet, laid in hydraulic cement and dowelled to the riverbed and to each other. The dam varies in height from 30 feet to 41 feet and in thickness from 35 feet at the base to 13 feet at the top. With its wing-walls of dressed granite, the dam is 1,629 feet in total length. A 900-foot section spans the river; a 405-foot north wing connects to the **North Canal**, and a 324-foot south wing connects to the South Canal (outside the district), which was built in 1865. Other than the south wing addition, a concrete fish-way built in 1917, and a hydroelectric plant begun in 1978, both on the south side of the river (outside the district), the dam has not been altered.

The wood-frame **gatehouse** (Map 2-I), completed in 1848, has 24 gates, now electrically operated, which control the amount of water entering the sluiceways. The exterior is clapboard, with seven windows along each side. Greek Revival features include wide pilasters at the corners, returns at the eaves, and an entry transom. The 1845 Greek Revival-style **North Canal Gatekeeper's House** (Map 3, Photo 1) still stands, along with the ca. 1860s **North Canal Barn** (Map 3-I). The grounds around the house feature a variety of original landscape details, such as granite walls and steps.

The Pacific Mills
Due to the size of the Pacific Mills complex, the buildings often carry the name "Upper or "Lower" Pacific, a geographical designation that places them within their respective mill yards.

Immediately to the east across Broadway is the flat-roof, five-story **Upper Pacific Storehouse #5** (Map 5). Built ca. 1860, it is the oldest of the remaining buildings of the once-extensive Pacific Mill Yard. Its small, asymmetrically placed windows with granite sills are typical of warehouse construction. The upper story has heavy corbelling between small attic windows. The southern portion of the storehouse was razed. Fragments of the 1852 granite **Pacific Cotton Mill** (Map 4-I, Photo 2) stand east of the Upper Pacific Storehouse.

The large brick **Cotton Mill Weave Shed and Office** (Pacific Mills, Map 4), constructed in 1890, runs for 300 feet along the Canal. This flat-roof, two-story building was one of the last additions to the Pacific Mills cotton complex. Large windows with brick arches and granite sills were retained in a 1980s renovation. A tall, octagonal smokestack was constructed when steam power was introduced. The weave shed and office building, designed by Hiram F. Mills, now encloses this once-freestanding chimney. Of the penstock racks that channeled water into the turbines, two are intact in

(continued)

the canal wall. The office section—connected to the western end of the weave shed—was designed by Boston architect George Moffette, Jr., and built in 1887 for the Pacific Mill Company. The two-story office rests on a high dressed granite foundation; round-arched Renaissance windows distinguish it from the functional treatment of the attached weave shed. Two buttresses, decorated with vertical brick panels, are carried above the decorated brick cornice. The buttresses flank the now-altered entry.

The Pacific Mills cotton complex, constructed on the north side of the North Canal in the l890s, is largely intact: the **Pacific Worsted Mill #10** (Map 14), a six-story, flat-roof brick structure built in 1888-9, and the **Upper Pacific Storehouse #7** (Map 15, Photo 7), a seven-story brick structure built in 1896, are situated between Methuen and Canal Streets on a site once occupied by Pacific Mills boarding houses. The adjacent **Upper Pacific Cotton Yarn Mill #5** (Map 11, Photo 6), built in 1902, is distinguished by molded brick entryways. The one-story **Upper Pacific Yarn Mill** of 1896 (Map 13) is one of the last additions to the Upper Pacific complex. All are of standard, flat-roofed, brick mill construction.

At the eastern edge of the Upper Island, the **Atlantic Mill Co. Spinning Mill #5** (Map 9), built ca. 1906 as a weaving shed, stands on the site of a large structure that the Essex Company built in 1846 for the Atlantic Mill Company as the second mill in Lawrence. Earlier Atlantic Mill buildings have been razed, many in 1918 when the **Central Bridge** (now Joseph W. Casey Bridge) was built. The surviving spinning mill has a flat roof, large segmental-arch windows, and undecorated brick piers.

At the intersection of Canal and Amesbury Streets is the **Atlantic Cotton Mills Boarding House** (Map 17, Photo 10). Built in 1847, it was originally part of an extensive complex of company-owned housing along Canal Street, and it is one of two boardinghouses extant in the district. The seven-bay, pitch-roof redbrick structure has a granite rubble foundation. Five pedimented dormers light the attic; six original chimneys are intact. Rectangular window openings, with granite sills and lintels, contain six-paned double-hung sashes. The building is used for retail and residential purposes. One bay of the ground floor was remodeled for retail space ca. 1928; a concrete-block two-story addition extends from the west end of the boarding house.

THE MIDDLE ISLAND: Amesbury Street to Union Street

The Middle Island, between the **Central Bridge** (now Casey Bridge) and the **Union Street (Duck) Bridge**, contains an early Bay State boardinghouse, a railroad shed from the l870s, and extensive complexes of the Lower Pacific and Washington-American Woolen Company mills and their related powerhouses and boilers. Here the district's northern boundary runs to Essex Street, encompassing the Essex Company offices, a public school, and a stable. Many industrial structures stand along the banks of the Merrimack River and the North Canal edges, abutting each other in continuous facades dating from several decades of mill development.

Lower Pacific Mills

Situated near the **Central Bridge** (now Casey Bridge), the **Lower Pacific Worsted Mill** (Map 20) was built in 1864 on the so-called Central Mill site of the Essex Company. Originally two stories high and used as a worsted woolen mill, the

(continued)

building was enlarged in 1877 by two more stories and a mansard roof. It retains triple-sash windows, but the mansard roofs were replaced with a flat roof, probably in 1908, when the building was enlarged to its present 150 foot-by-350 foot footprint. The original east and west elevation fenestration (double windows recessed in prominent bays) has been altered by the blocking-up of many windows; the canal-facing facade has a projecting six-bay central pavilion with tall segmental-arch windows; office entrances are distinguished in prominent brick arches carried by brick piers. The Lower Pacific complex includes a brick one-story **Boiler House and Engine Room** (Map 21), built in 1885 to the designs of mill architect Charles T. Main, and retains both its hip roof surmounted by a monitor roof, and its octagonal stack. To the west of this building is a portion of the 1883 brick **Lower Pacific Cotton Mill** (Map 19), while a section of the west wall of the earlier Pacific Mills (**Ruin**, map #19-I) stands at the west of the mill yard.

The brick five-story, 100 feet -by-275 feet **Lower Pacific Finishing Mill** (Map 22), built in 1911, is connected to the worsted mill by a bridge, and abuts the Washington Mills-American Woolen Company complex at the west. Located at the corner of Appleton Street and Canal Street, the 1870s **Lower Pacific Bridge** (Map 25) is an eight-panel, Pratt-style truss bridge, 20 feet wide and spanning 90 feet. The vertical members are stamped "PHOENIX IRON WORKS, PHILADELPHIA."

The 1882 five-story brick **Lower Pacific Finishing and Packing Mill** (Map 23, Photo 9) is identified by the words "LOWER PACIFIC MILLS" set in granite on the north wall of the bell tower. The prominent buttressed bell tower/stair tower has a pyramidal roof with weathervane, which covers an open belfry. Ornamental ironwork is set into the opening; granite stringcourses and thick lintels over narrow, glazed windows enhance the fortress-like appearance of the tower. The main office entrance leads to an elaborate staircase, and the hall immediately beyond the entry has a coffered ceiling and woodwork, which contrasts with the functional treatment of the mill spaces beyond.

Bay State Mills, Washington Mills, American Woolen Company

The Washington Mills Company factories (built after 1899, part of the American Woolen Company) and related structures occupy the site of the 1846 Bay State Woolen Mills. The 1886 **Washington Mills Building #1** (Map 27, Photo 13) is a five-story plus basement, flat-roofed structure, with uniform rows of segmental arched windows built over a portion of an 1848 mill. The date 1886 is set in granite under the open belfry of the stairtower/bell tower below a granite stringcourse. The stair tower is differentiated from the mill's uniform fenestration by paired round-arched windows. In 2006-2007, the Architectural Heritage Foundation and the Bank of America CDC renovated this building to house 155 loft-style apartments. The renovation, completed according to the designs of Durkee, Brown, Viveiros and Werenfels Architects, included preservation of all façade elements, replacement of windows, and the addition of a steel-and-glass entryway on the canal side of the building.

To the south of this building is the flat-roofed 1886-87 **Washington Mills Co. Building #6 (River Mill),** (Map 32, Photo 15), a 475 feet-by-93 feet seven-story brick building of utilitarian design. Boston's Lockwood, Greene & Company, leading mill engineers, supervised the 1886-1887 reconstruction of an earlier mill. The stair tower breaks the uniform facade of segmental-arch windows between brick piers. A 100 feet-by-233 feet one-story, steel-frame, brick-faced addition was added at the north end in 1953.

(continued)

Across the canal is the ten-story **American Woolen Company Storehouse #10** (Map 29, Photo 14), designed by Charles T. Main and built in 1919 of brick and reinforced concrete on the site of storehouses and boardinghouses of the Washington Mill Company. The latter had been absorbed in 1899 by the American Woolen Company, which built its distinctive Georgian Revival **American Woolen Company Office** in 1900 (Map 31). Its entry, centered in the rusticated first story, has two splayed engaged columns and two freestanding rusticated columns. With prominent keystone-arch fenestration, this is one of the most style-conscious buildings in the district. As of 2008, this building is vacant and for sale.

Just to the north, at the northwest corner of Methuen and Mill Streets, stands the **Morehouse Bakery** (Map 33, Photos 23-28), which comprises the boundary increase to the present nomination. The building consists of a main block three stories high (constructed in 1907) and two smaller garage additions to the west, one two stories high (1917) and the other one story in height (1931). A full architectural description is presented at the end of Section 7. The Morehouse Bakery stands to the northwest of the **Homeland Security Citizenship Center** (Map 80), which is being constructed on a site formerly occupied by an American Woolen Company Storehouse (1900), which was demolished to make way for the new building.

On the north side of the canal, the **Bay State Woolen Mills Boarding House** (Map 30), designed by Phineas Stevens and built in brick ca. 1847, has a pitched roof and stands on a granite rubble foundation. The eleven-bay facade has rectangular window openings with granite sills and six-pane double-hung sash windows. The boarding house is now the Essex National Heritage Area Visitor's Center and a museum for the **Lawrence Heritage State Park**, situated directly north of the building (Map 34).

Among the most architecturally notable mills is the **Pemberton Manufacturing Company Main Mill** (Map 42, Photo 17), built in 1860-1861 to the designs of Theodore Voelkers, an architect trained in Germany. This five-story woolen mill, built on the site of the 1853 Pemberton Mill that collapsed in 1860, has Romanesque windows, a trap-door monitor in the main pitch roof, and a crenellated cornice; the prominent stair towers have gambrel roofs. Its foundation incorporates part of the foundation of the collapsed 1853 mill.

A three-story, flat-roofed **Pemberton Company Office and Warehouse #3** (Map 35), built ca. 1890, is situated immediately opposite the mill and was connected to the main mill by a railroad bridge. A ca. 1880 square, flat-roofed brick **Pemberton Manufacturing Company Stable** (Map 37) is immediately east of the storehouse. Although the Methuen Street facade has been altered, the building retains a large rear entry and details such as prominent brick hood moldings at the east elevation. (Photo 16)

Lawrence Duck Mills

The 200 feet by 40 feet 1853 **Lawrence Duck Company Mill #3** (Map 44, Photo 17) was much altered over time, with additions and renovations through 1896. In 1906, Charles T. Main supervised its remodeling.

(continued)

Walton School

At the northern edge of the District between Newbury and Essex Streets is the Italianate brick **Walton School** (Map 36). Built ca. 1860 by the City of Lawrence, the Walton School has a pitched roof and ornamental detail in a raised-panel pattern terminating in a fanlight at the west elevation. Ornamental iron cresting has been removed from the hip-roofed pavilion, but a prominent round-arched entry with brick hood molding and corbel stops is an unaltered original feature.

Essex Company Office and Yard

The **Essex Company Offices and Yard** (Map 39), which includes five attached red brick, flat-roofed structures dating from 1883-1884, is an intact complex of utilitarian buildings designed by Hiram Mills, chief engineer of the Essex Company. They have corbelled cornices and granite trim. The complex includes an office, carpenter shop, foundry, garage, and storage building, and is surrounded by a red brick wall from 1884.

THE LOWER ISLAND: Union Street to Prospect Street

The Lower Island includes the North Canal's easterly terminus, where its waters flow into the Spicket and Merrimack Rivers, and the Essex Company's 1848 Lawrence Machine Shop, paper mills, foundries, and the woolen and cotton mills built by the Everett and Kuhnhardt Mill Companies.

To accommodate the lengthy Everett Mills and the paper mill site to the east, the district continues north to General Street and runs south along the Spicket River. Across the Canal, along Island Street, smaller structures occupy an asphalt paved surface, which gives way at the eastern point to river grass and brush, contrasting with the turf of the preceding mile along the Canal.

Everett Cotton Mills

When built in 1909, the **Everett Mills Company Weaving and Spinning Mill #5** (Map 46) was the largest cotton mill in existence. The six-story, 780 feet long building has twelve acres of floor space. The flat-roofed mill is actually two buildings joined by a central pavilion; the north structure has a footprint of 460 by 100 feet, and the south is 32 by 75 feet. Its arched, multi-paned windows are recessed between brick pilasters that terminate in a corbelled cornice. The central pavilion is composed of granite ashlar piers which carry a four-story, round-arched, entry flanked by granite capped pilasters. A granite-trimmed clock is centered over the arcade, and the words "Everett Mills" are set in granite over the entry arch. The original Everett Company doors, accessing the mill and the former machine shop, are intact.

Essex Company Machine Shop (later Everett Cotton mills)

East of the main Everett factory is the large, four-story **Essex Company Main Mill #1** (Map 48, Photo 19), built in 1846 for the manufacture of railroad locomotives, tools, water turbines, textiles, and other machinery. The original building has ochre-colored walls of fieldstone and granite rubble. It was sold in 1857 to the Everett Mills Corporation, by which it was converted to a cotton mill and substantially enlarged. The 405 feet by 65 feet building has a steeply pitched roof

(continued)

interrupted by skylights. Three stair towers are evenly spaced along the western facade. A two-story forge shop once stood east of the machine shop, but has been demolished in recent years. The only remnant of the forge and its attached boiler room is a 125-foot circular smokestack, constructed of granite, which stands alone and is original to ca. 1846. To the south is the **site of the Everett Mill Company Cloth Room** (Map 51), which was demolished in recent years. The site is currently used for parking.

The 1863 **Everett Mills Storehouse #6** (Map 52, Photo 19) was built as a weaving mill. Originally a two-story building with gable roof, clerestory windows on the south side, and dormers on the north, it was enlarged by a third story in 1946. Among later additions to the complex was the 237 feet by 107 feet four-story brick Everett Mills Company Weaving Mill #4. Built in 1892 and torn down in recent years, the **site of Everett Mills Company Weaving Mill #4** (Map 49) appears on the datasheet as a vacant parcel. Another **Everett Mills Storehouse** (Map 53), seven stories in height, with a footprint measuring 150 feet by 50 feet, was built in 1905 on the banks of the Spicket River and remains today. The **Everett Mills Company Weaving and Spinning Mill #5** (map 46, Photo 18), built in 1909, was at the time the world's largest mill. A six-story, heavily buttressed brick building, it contained twelve acres of floor space under its flat roof. It features a granite-trimmed central pavilion and clock.

G.E. Kuhnhardt Woolen Mills

The six buildings of the George E. Kuhnhardt Woolen Mills were built between 1880 and 1916 on the site of the old Lawrence Mills. The three-story, flat-roofed **Kuhnhardt Woolen Mill #1 & Office** (Map 55), built in brick ca. 1890, has a corner tower with an open belfry and has undergone a recent interior renovation to serve as a commercial building and home to Cambridge College. The adjoining ca. 1890 **Mill #2** (Map 55) and freestanding two-story ca. 1896 **Kuhnhardt Woolen Shop and Boiler House** (Map 56) are executed in red pressed brick. (Photo 20)

Hamblet Foundry

The **Hamblet Machine Company** (Map 60) complex includes an 1859 wood-frame section built by the Webster-Dustin Machine Company, manufacturers of mill machinery. In 1899, the Hamblet Company, a manufacturer of machinery for paper mills, purchased the buildings, which were altered after a fire in 1902. The hip-roofed office portion fronting on Island Street was added in 1925.

Lockkeeper's House Site

Now a vacant lot (Map 65), this is the site of the ca.1848 **North Canal Lockkeeper's House**. It was a center-entrance, Greek Revival-style, two-story frame building standing on a granite rubble foundation. It was demolished in 1984.

Russell Paper Company

The granite-rubble ca. 1853 **Lawrence Pump & Engine Company** (Map 68) has exposed reinforcing rods and brick-trimmed segmental arch windows. This building was once adjoined by the wooden ca. 1875 **Russell Paper Company Storehouse** (Map 67). That storehouse may be the basis for the noncontributing building on that site today. Clad in industrial-style shingles, it is impossible to observe any original details, and it appears to date to the 1970s.

(continued)

Spicket Penstock and Prospect Street Bridge

The **Spicket Penstock** (Map 69) was built in 1855 to carry canal water to paper-mill turbines on the Spicket River. The original wooden penstock was rebuilt in 1899 and 1913 in steel and concrete. The penstock is spanned by the 1855 **Prospect Street Bridge** (Map 70).

BOUNDARY INCREASE

Morehouse Bakery Building

The **Morehouse Bakery Building** (Map 33), utilitarian in style and half a city block in size, is a 40,000 square foot. brick, multiple-build manufacturing and warehousing structure. The earliest portion was erected in 1907 and subsequently enlarged in 1914, 1924, 1929, and 1931. The building's architecture and materials are consistent with other large manufacturing buildings in the District, and it has features in common—cornice, arched windows, brickwork, and a street-line footprint. While the Morehouse Bakery Building has a two-story and a one-story addition at its western side, the main structure, built 1907-1924, is three stories high, stylistically (but not always formally) unified, and made up of three separate builds, fronting a total of 100 feet on Methuen Street and 78 feet on Mill Street. (Photo 23)

The original building is high-studded and taller than some other three-story buildings, and its fenestration and modestly projecting cornice (about two feet from the façade wall) contribute to its sense of verticality. Its horizontal expanses of common-bond red brick are well balanced by its many windows, which, at the second and third stories, are large, well spaced, and nearly symmetrical (the easternmost windows in each floor are spaced somewhat farther from their neighbors than are the rest of the windows). The building's doorways are strictly utilitarian. On the Methuen Street side, an arched doorway, which served as a loading dock for wagons and trucks, occupies the fifth bay in the first floor. Otherwise, the first-floor fenestration is identical to that of the floors above. At grade level, aligned with the windows above, are small arched "eyebrow" windows that admit sunlight into the basement. The wooden roof cornice projects sufficiently to afford some protection from rain and to emphasize its beveled modillions.

On its eastern elevation, the Morehouse Bakery building of 1907 carries on the regular and bold fenestration of the southern elevation, maintaining harmony of form and detail above the first floor. At the first floor level, however, the building's fenestration is irregular; there is evidence of bricked-in doorways and windows as well as the original personnel entrance. (Photo 28) Assuming all openings are original, the first floor of the eastern elevation of the building was irregular and contrasted sharply with the southern elevation, an instance of the artlessness that was typical of the design of utilitarian buildings. It should be noted that, on both of these elevations, large horizontal portions of the brickwork are different in color from other portions of the brick wall, indicating areas in which painted signage was erased.

The first addition occurred in 1914 (per building permits). Attached to the west side of the earlier portion on Methuen Street, it is similar in form and style to the original building. It is common-bond red brick (all brickwork is consistent in

(continued)

color here), three stories in height, four bays, with an entry at the first floor. It is harmonious with but not identical to the 1907 building. Where they abut, there is a clear seam in the brickwork, and there is a large vertical expanse of brick that separates the westerly bay of the 1907 fenestration from the easterly bay of the 1914 addition. The buildings have identical fenestration patterns and cornice line. (Photo 26)

The three-story building campaign was completed in 1924, with an addition on Mill Street, adjoining the north side of the 1907 building and fronting 33 feet with four bays added to the eastern elevation. This addition bears only an uneasy resemblance to its neighbor, although at the third-floor level and the cornice they are perfectly harmonious. At the first and second floors, this building is quite distinct from the original building. Here, at the second story, the fenestration is rhythmic: two regular-sized windows flank two doublewide windows that contain two sets of sash windows each. As with the rest of the building, the window openings were laid up in shallow triple-header arches, with granite sills. On the first floor, the opposite rhythm is found: two doublewide arched windows flank two doors that are roughly as wide as the third-floor windows. (Photo 27)

On the north side elevation, this addition's fenestration is not symmetrical, in part because here the building overlooked an alleyway. The openings are consistent in style and detail with the other windows of the building, but each story relates more to itself than to the story above or below.

In 1929, a section was added on the west elevation of the building, fronting on Methuen Street. At two stories, this brick six-bay addition was joined in 1931, on its west end, by a one-story brick garage addition, five bays on Methuen Street to the south. (Photo 24) There are two skylights in the roof of the two-story 1929 addition and four in the roof of the 1931 one-story addition.

The 1929 section, at the second floor, has windows of the size, shape, details, and spacing of the 1914 building, but this does not suffice to connect the two builds visually. The 1929 cornice is without elaboration and begins abruptly above the window arches; it is totally unrelated to the much-higher cornices of 1907-1924 with their fasciae, projecting eaves, and modillions. At the first story, the 1929 addition has four large, rectangular garage door openings for vehicles, firehouse style. Its westerly elevation, visible only at the second story, has ten bays, extending the full depth of the 1907-1924 building. The simple cornice is found here, and the window openings, lacking arched heads, are finished with straight lintels.

The one-story 1931 section is a stylistic departure from the rest of the building. A slightly protruding pavilion with a stepped pedimented parapet that conceals a flat roof and four skylights dominates the southern elevation. At its ground floor, this section has various openings: one large garage door to the east; then two rectangular windows (large but of different sizes) with multi-paned fixed windows with cement sills; then two more such windows, of the same size as each other; and finally a combination window and door, in which the upper half-window might be said to serve as a transom. Above the openings is a belt course; the frieze of the pediment has a panel of herringbone decorative brickwork. The west elevation has two doors and a three-story industrial smokestack, laid up as a rectangular brick chimney, embedded in the southern end of the west elevation. Attached to the northern half of the west elevation is a concrete-block shed.

(continued)

Archaeological Description

No artifacts are presently associated with the site. That site, first identified by Warren K. Moorehead in 1931, then recorded in the Massachusetts Archaeological Society site inventory in 1940 by Ripley P. Bullen, was incorporated into the Inventory of Historic and Archaeological Assets of the Commonwealth in 1968. No records exist that indicate the site was ever systematically tested, indicating site boundaries are approximate only.

Environmental characteristics of the district, prior to 19th-century historic development, represented locational criteria (slope, soil drainage, proximity to wetlands) that were favorable for the presence of Native sites. The district presently occupies a level to moderately sloping riverine terrace with southern aspect in close proximity to wetlands. The entire district lies within 1,000 feet of the Merrimack and Spicket Rivers. The Merrimack River forms most of the southern boundary of the district with the North Canal, paralleling the Merrimack River near the northern boundary of the district. The confluence of the Spicket and Merrimack Rivers is located at the eastern end of the district. A detailed soil survey of the area identifies the entire district as urban land or areas where soils have been altered or obscured by urban works and structures. Buildings, industrial areas, paved areas, and railroad yards cover nearly 75% of the land surface. Some small areas of natural soils are included. Regional soil distributions, however, present a description of soil characteristics that may reflect conditions prior to historic development. Those studies describe excessively drained sandy and loamy soils formed in glacial outwash deposits as characteristic of the area.

Given the information presented above, the potential for locating significant ancient Native American sites in the North Canal Historic District was high prior to historic development of the area. Site 19-ES-0182 may have extended into the western portion of the district, and undisturbed environmental characteristics of the district represent locational criteria that are favorable for the presence of Native sites. Historic urban/industrial development of the district, however, has altered soil stratigraphy and surface conditions of the area to the point that any ancient Native American resources that were present have been destroyed. Deeply buried features and isolated concentrations of artifacts may survive; however, the overall site integrity and context have been destroyed. A low potential exists for the recovery of significant ancient Native American resources in the North Canal Historic District.

A high potential exists for the recovery of significant historic archaeological resources in the North Canal Historic District. Prior to 1845, what is now the historic district was riverbank farmland in the town of Methuen. No structures, objects, or potential sites have been identified from this period. Beginning in 1845, however, numerous potential

(continued)

historic archaeological sites exist in the district as land was reconfigured, with dredged "new" land and dams, locks, gates, and waterways constructed to provide waterpower and building sites for residential and industrial structures and the infrastructure needed to support those developments. Industrial-related construction occurred in several phases from the 1840s to the early 20th century, with the last phase of mill construction in the 1920s. Throughout that development, mill sites were rebuilt continually, often resulting in earlier buildings and structures being demolished, and at times, being incorporated into later structures. Successive stages of rebuilding mill sites also indicate the potential for stratified sites. Structural evidence of buildings, waterpower-related structures, and occupational-related features may survive in most areas of the proposed historic district.

While the original Great Stone Dam (1848), North Canal (1848), and related penstocks and raceways are still in place, archaeological testing may identify important structural, stratigraphic, and artifactual evidence relating to their construction and operation. Historic research, combined with archaeological survey and testing, may identify additional waterways that existed between the canal and the mills and between the mills themselves.

In the Upper Island locale from Broadway to Amesbury Street, structural evidence may survive from several mill buildings, boardinghouses, and a bridge. Structural evidence may exist for parts of the extant Upper Pacific Storehouse #5 (ca. 1860) on Broadway, where the southern portion of the storehouse was demolished. Structural evidence may also survive from the 1852 granite Pacific Cotton Mill east of the Upper Pacific Storehouse and a large mill building built by the Essex Company in 1846 for the Atlantic Mill Company as the second mill in Lawrence. The previous site is now occupied by the Atlantic Mill Company Spinning Mill No. 5 (1906) on Canal Street. Bridge footings and/or abutments may survive from an earlier bridge located between the Upper Pacific and Atlantic Mills near the site of the existing Upper Pacific Bridge (1864).

Archaeological evidence of company-owned boardinghouses might also survive in the Upper Island locale. The extant Upper Pacific Storehouse #7 (1896) is located between Methuen and Canal Streets on a site once occupied by Pacific Mills boardinghouses. Archaeological evidence of company-owned boardinghouses may also survive in the vicinity of the extant Atlantic Cotton Mills Boarding House (1847), originally part of an extensive complex of company-owned housing along Canal Street, and one of two surviving boardinghouses in the district.

Mid 19th- to early 20th- century industrial sites may also survive in the Middle Island area of the district located from Amesbury Street to Union Street. Structural evidence may survive from the so-called Central Mill site of the Essex Company now occupied by the Lower Pacific Worsted Mill (1864) on Canal Street near the Central Bridge (now the Casey Bridge). Portions of two mill buildings may survive to the west of the Lower Pacific Boiler House and Engine Room on Canal Street. Structural evidence may survive with surviving portions of the Lower Pacific Cotton Mill (1883). A section of the west wall of the earlier Pacific Mills is also extant, indicating the potential for additional structural survivals of the Pacific Mills. Archaeological evidence of the Bay State Woolen Mills (1846) may survive on the site of the extant Washington Mills Company Factories built in 1899 as part of the American Woolen Company. The Bay State Woolen Mills was the first mill to become operational in the district. Structural evidence of the Pemberton Mill (1853) that collapsed in 1860 may also survive on Canal Street. The foundation of the existing Pemberton Manufacturing Company Main Mill (1860-1861) is reported to incorporate portions of the foundation from the collapsed 1853 mill. Archaeological evidence may survive from the American Woolen Company Storehouse (1900), demolished to make way for the existing Homeland Security Citizenship Center (2008).

(continued)

The Morehouse Bakery Building (1906-1931), the subject of the boundary increase aspect of this nomination, is located in the Middle Island area of the historic district. Prior to construction of the Morehouse building, the land at the corner of Mill and Methuen Streets had never been developed, since the Essex Company prohibited construction on the south side of Essex Street until the northern side had been built out. Given the previous statement, no buildings were demolished for construction of the original Morehouse Bakery Building. Later additions, however, resulted in several building demolitions prior to construction of the additions. In 1914, a three-story addition to the west side of the building resulted in the demolition of the loaving shed. The latter structure was added to the original building shortly after its construction in 1907. During the 1924 addition, two three-story structures and a two-story barn were demolished to make way for the addition. Three row houses were also demolished in 1931 to make way for a one-story garage, the final section of the complex.

In the Lower Island area from Union Street to Prospect Street, several industrial-related buildings continued to be demolished in recent years. Structural evidence may survive from the Essex Company forge shop that originally stood east of the machine shop off Union Street. The only remnant of the forge and attached boiler room to survive is the 125-foot granite smokestack (ca. 1846). Archaeological evidence of the Everett Mill Company Cloth Room may survive south of the smokestack. The cloth room site is now used for parking. Archaeological evidence may also survive from the Everett Mills Company Weaving Mill #4 (1892), demolished in recent years. Structural evidence may survive from the North Canal Lockkeeper's House (ca. 1848) on Island Street. The Lockkeeper's House has been demolished and is now a vacant lot.

While the discussion presented above identifies several potential sites of buildings located within the various mill complexes in the district, additional potential mill sites also exist. Archaeological evidence of barns, stables, outbuildings, and occupational-related features (trash pits, privies, wells) also should exist with extant buildings and at archaeological sites. At industrial sites, industrial trash dumps where manufacturing waste was deposited may represent occupational related features. At domestic sites such as boardinghouses and lockkeeper's houses, occupational-related features may include more characteristic trash pits, privies, and wells. Archaeological evidence of public utilities (electric, water, sewers, etc.) may also survive in the district.

(end)

STATEMENT OF SIGNIFICANCE

NOTE: The purpose of this nomination is to expand the boundary of the of the North Canal Historic District (NRDIS 1984) to include the adjacent Morehouse Bakery building and to bring the information on the previously listed buildings up to date. Two structures—the **North Canal** and the **Great Stone Dam --** were individually listed in the National Register of Historic Places in 1975 and 1977, respectively. The technical amendment portion of the nomination integrates new information and changes into the text of the original nomination. A section on the Morehouse Bakery, which contributes to the district's significance, has been added at the end of sections 7 and 8. The district's period of significance has been expanded to 1959 to incorporate resources that have become contributing properties in the last 50 years.

Since the North Canal Historic District was listed in 1984, two new buildings have been constructed within its boundaries: a large four-story parking garage (**Museum Square Garage,** Map 24-I, 365 Canal Street) and a large three-story office building (**Fenton Judicial Center**, Map 24, 361 Canal Street). Both were built in 1994-1995 and designed by architects Andrea Leers and Jane Weinzapfel. In addition, **Lawrence Heritage State Park** (Map 34) was created in 1985, and a major renovation of **Washington Mills Building No. 1** (Map 27) was completed in 2007. The district continues to retain integrity and to fulfill criteria A and C at the local, state, and national levels of significance.

The North Canal Historic District, on the north side of the Merrimack River, is at the industrial heart of the city of Lawrence, a Massachusetts municipality that was created from parts of Andover and Methuen. Portions of these communities were purchased in 1845 by a group of Boston industrialists headed by the wealthy merchant and congressman Abbott Lawrence, from whom the city takes its name. Incorporated in 1853, Lawrence became one of the largest and best-planned mill cities ever undertaken in America.

The mills, factories, boardinghouses, locks, dams, and bridges are significant for their association with the 19th-century development of Lawrence as a major industrial city, and with the businessmen, inventors, architects, and engineers connected with the development of the mills over a 100-year period. Three of the engineers associated with the development of buildings and projects in the district—Charles S. Storrow, Hiram F. Mills, and Charles T. Main—are featured in the *Dictionary of American Biography*.

The area embodies the distinctive characteristics of mid 19th- to early 20th-century industrial architecture and represents a distinguishable entity from that period. The district has enduring fame as both the producer of millions of yards of textiles over the course of 100 years, and as the site of the triumph of science and technology over a devastating disease, typhoid fever. Other historic events that occurred within the district include the infamous collapse of the Pemberton Mill in 1860—a disaster that led to reforms in industrial safety—the "Bread & Roses Strike" of 1912, and the Lawrence Strike of 1919. Both worker's strikes were seminal events in industrial labor history and in the women's rights movement.

From 1845 onward, the district was the focus of construction that was informed by consistent design control and a unified social and aesthetic vision. Its proximate model was the mill town of Manchester, New Hampshire, developed in the 1830s. In addition, many investors had been involved in developing the nearby mill city of Lowell twenty years earlier. In 1845, the Essex Company, developers of the mill city, purchased 4,313 acres of land north and south of the river from Methuen and Andover landowners. Charles S. Storrow (1809-1904), a Paris-trained engineer, became the company's treasurer. In

(continued)

addition, Storrow was hired to act as master planner and on-site manager. Storrow, an 1829 graduate of Harvard, studied engineering under Loammi Baldwin before going to France in 1830-1831. In the 1830s he was the chief engineer for the building of the Boston & Lowell Railroad, the first in the state; and he worked from 1835-1845 as its manager before coming to the Essex Company. Storrow was the author of *Treatise on Water-Works* (1835) based on his study of the Lowell mills.

Storrow's vision informed every aspect of the creation of the North Canal area between 1845 and 1860, including construction of the dam, locks and canal, lumber dock, machine shop, mechanics and operatives' tenements, a paper mill, and the large factories of the Atlantic, Pacific, Pemberton, and Lawrence Duck mill companies. In designing and building the **North Canal** (Map 1) and the **Great Stone Dam** (Map 2), Storrow incorporated new technologies and applied ideas from other Merrimack River industrial towns. A notable innovation in mill city building was Storrow's incorporation of railroad spurs into the plan. He laid out a grid of 60 square blocks, from the Merrimack River to the mill island formed by the construction of the North Canal. Storrow's system of functional zoning is evident today: much of the Essex Company housing was concentrated on the first two blocks north of the canal; a retail district was assigned to Essex Street (its north side was built up first); and a residential-institutional district was arranged around the town common. Residential lots, platted in other parcels owned by the Essex Company, were sold at auctions in 1846, 1847, and 1855. Deed restrictions specified building height and construction relative to the area and the use of the building.

Charles Storrow was unique among 19th-century developers in moving on-site and becoming an inhabitant of the city as it was being built. His success was capped by his election in 1853 as Lawrence's first mayor. In approaching this massive project he saw "the elements of society ready to be molded into a good or evil shape, nothing to pull down, all to build up," and he was concerned both for the Essex Company's interests and for the working conditions and comfort and welfare of the residents. Many of the population were recent immigrants from Ireland, escaping the potato famine: by 1848, one in three mill operatives in Lawrence had been born in Ireland.

As the focus of Lawrence's early industrial development, the first textile mills, factories, and boardinghouses were located in the district site on the canal lots leased or purchased from the Essex Company. The land between Methuen Street and the canal, and along the canal island between Broadway (the Essex Turnpike of 1804) and the Spicket River, was built up with factories. Along the North Canal of the Merrimack, newly developing textile-manufacturing technology came together with favorable market conditions, a large supply of labor, and large-scale industrial investment. The area was well serviced: a sewer system and a reservoir were provided by the Essex Company, gas light was introduced in 1848, and regular passenger train service on the Boston & Maine Railroad was established in 1849.

In addition to its crucial importance in the areas of urban planning, hydraulic engineering, textile manufacturing, immigrant settlement, feminism, and the labor movement, the district has great significance in the field of public health. The water that drove the looms in the mills also killed people through the transmission of typhoid fever, a water-borne disease. The **Lawrence Experimental Sanitation Station**, which stood on Island Street (not extant, map #64), was dedicated to ending the worldwide scourge of typhoid fever. The first research facility of its kind in the country, it began operations in 1886 in quarters lent to the Massachusetts State Board of Health by the Essex Company.

On the plan created by Charles Storrow, the groundwork was laid for the later development of North Canal industries between 1845 and 1860. In contrast to the engineering of the canal, which permitted adaptation as technology improved, the first generation of tall, narrow factories were later replaced by large fireproof buildings.

(continued)

The first substantial building to be constructed along the canal was the formidable 1846 **Essex Company Main Mill #1** (Map 48), designed by Charles Bigelow. The four-story fieldstone-and-granite factory was part of a complex (no longer standing) that included a forge, a foundry, and a boiler house and that produced locomotives, mill machinery, and engines. The Main Mill is distinguished by its ochre-colored walls, small-paned windows, and outside stair towers. Fire regulations later prohibited the use of pitched roofs on stone factories. It was designated as a National Civil Engineering Landmark in 1975

In 1846, the Bay State Mills and Atlantic Cotton Mills companies purchased mill sites and mill power rights from the Essex Company. Both developments were planned as large-scale endeavors: the Bay State Mill Company buildings (no longer standing) were erected at cost by the Essex Company and supervised by Col. Phineas Stevens, and included three pitched-roof brick woolen mills surrounded by a row of three- to five-story buildings. In addition, four blocks of brick boarding houses, each block with 36 boarders, were built on the other (northerly) side of the Canal between Jackson and Newbury Streets. Unlike nearby Lowell, Lawrence's boardinghouses were not gender segregated. Today the **Bay State Woolen Mills Boarding House** (Map 30) serves as the Essex National Heritage Area Visitor's Center and as a museum for the **Lawrence Heritage State Park** (Map 34).

The waterpower created by the **Great Stone Dam** and **North Canal** was enhanced by the later introduction of water turbines, far more powerful and efficient than the earlier breast wheels. By the 1860s, steam power largely replaced water power, dictating changes in the extant mills and in the design of new mills. The **Great Stone Dam Gatehouse** (Map 2-I) and the **North Canal Gatekeeper's House** (Map 3) are significant markers at the western terminus of the canal. The lock keeper's house (now a vacant lot, Map 65), which marked the eastern end the North Canal, was demolished after 1984.

In 1846, at the Upper Island, the Atlantic Cotton Company built two of four planned mills and added a third in 1852. Machinery was supplied by the Lawrence Mechanics Shop. Charles Bigelow, Essex Company Engineer, supervised the construction of the mills and associated waterpower structures, wheel pits, and waterways. Atlantic workers were housed in six blocks of boardinghouses located on Canal and Methuen Streets, between Hampshire and Lawrence Streets. The first opened in 1847 and was reportedly the first brick dwelling erected in the city. With these two early narrow, multistory textile mills and their boardinghouses, the architectural character of Lawrence's mill complexes and its nearby housing was established. The surviving boardinghouses show a preference for simplicity of design in the gable returns with corbel tables and the granite-trimmed window and door openings. Their details and silhouettes echo those of the nearby mills and reflect the early "corporate style" of Manchester and Lowell. The small scale of the **Bay State Boarding House** (Map 30) and **Atlantic Cotton Mills Boarding House** (Map 17) contrasts sharply with the later mill developments around them.

In 1852-1853, the Essex Company's engineer, Charles Bigelow, supervised the construction of the six-story **Lower Pacific Cotton Mill** (partially extant, Map 19). Built of coursed granite rubble, the mill was first used for production of ladies' dress goods. A continuous row of two- and three-story buildings enclosed the mill. An early manufacturer of worsted goods, the Pacific would eventually become the largest of the mill complexes, producing 65 million yards of cotton and worsted goods annually by 1877. In 1853, the Essex Company designed and constructed the Pemberton Mill to produce cotton and woolen goods while workers' housing went up on the other (northerly) side of the canal. In 1860, the Pemberton Mill collapsed and burned, killing 88 people. This tragedy, which received nationwide media coverage, spurred an interest in safety regulations for industrial buildings. The **Pemberton Manufacturing Company Main Mill** (Map 42) was built in 1861 on the same site.

(continued)

The Romanesque design of this mill is among the most distinct in the district. The five-story, pitched-roof building has a corbel table in the gable end, mansard-roof stair towers at the east and west elevations, a trap-door monitor roof, and round-top arched windows in the north and south elevations. To the east, the **Lawrence Duck Company Mill #3** (Map 44) was built in 1853-1854 by the Essex Company. The Everett Mill Company purchased the bankrupt **Essex Company Main Mill #1** (Map 48) in 1857 and converted it to a cotton mill with the addition of several new structures.

The mill owners' willingness to diversify among cotton, woolen, and worsted-wool and to experiment with production techniques would be a key to the long-term success of the city. In addition, it allowed the industry to survive business failures and financial collapses. The Bay State Mills, known for their "Bay State Shawls," were closed in the Panic of 1857, but reopened in 1859 under the ownership of the Washington Mills. In 1869, under the leadership of E.R. Mudge, the Washington Mills installed worsted machinery imported from France and thus became the first producer of all-woolen worsted goods in the United States. In addition to textile manufacturing, factories began manufacturing paper, as well as machinery for the paper and textile industries. The Pacific Mills Company also sponsored a variety of innovations, including ring-spinning spindles and the Wade bobbin-holder. Its management opened a library and founded a relief fund for the benefit of its employees.

The financial Panic of 1857, Charles Storrow's move to Boston in 1860, the Pemberton Mill collapse in 1860, and the outbreak of the Civil War in 1861 mark the end of Lawrence's first major period of growth, in which the population rose to 17,600 by 1860. Women and children made up a substantial portion of the workforce throughout the 19th century.

1860-1885

This period is significant for the increase in size of the workforce, mill buildings, and company structures. Between 1860 and 1875, Lawrence's population nearly doubled, growing from 17,639 to 34,916. The 1860 Italianate-style **Walton School** (Map 36) was built to meet the need for public schools for the district's large boardinghouse population.

Prior to the Civil War, the Pacific Mills were the largest producer of worsted woolens in the nation. Thereafter, encouraged by the protective tariffs on imported cloth, new technological developments, mass-market potential, and Civil War demand, other local manufacturers turned to worsteds, and Lawrence became the world's largest maker of worsted woolen goods. Diversification sustained the Lawrence textile industries through the post-Civil War years and through periods of fluctuating demand until the depression of 1893.

By 1860, the mill owners were no longer building pitch-roofed, stonewalled factories, but had come to favor slow-burning or fire-resistant construction, consisting of plank design, flat-roofed, heavy-timber-framed masonry-clad structures. Fire insurance companies were partially responsible for the change in mill construction standards, encouraging the adoption of floors and flat roofs of heavy plank and the elimination of concealed spaces within the mill. Better light and ventilation improved conditions for workers, but long working hours prevailed. Safety was also addressed by the introduction of sprinkler systems in 1875. Changes in design were also accompanied by a switch from waterpower to coal-fired steam power. By the mid-1880s, electricity was being introduced.

(continued)

In 1864, the Pacific Mills built the two-story **Lower Pacific Worsted Mill** (Map 20), the last major mill to be developed along the North Canal. Also known as the Central Pacific Mill, the 450-foot long building (with a 150-foot addition in 1908) accommodated new jacquard looms. The four-story mill (enlarged by two stories in 1877) was the first of a series of new buildings and improvements on the Pacific site. Its architectural treatment is typical of large post-Civil War mills.

Representative of the large brick mills and related structures of the period is the five-story 1882 **Lower Pacific Finishing and Packing Mill** (Map 23), whose outstanding architectural feature is the corner bell tower with its ornamental ironwork and corbelled opening as well as the finial-topped pyramidal roof. The **Lower Pacific Boiler House and Engine Room** (Map 21), built in 1885, was designed by superintendent Charles T. Main (1856-1943), who became Lawrence's leading mill architect and, eventually, president of the American Society of Mechanical Engineers (1918-1919). Main, a native of Marblehead and third-generation ropewalk mechanic, graduated from MIT in 1876 and worked as a draftsman before taking a job in 1881 as an engineer at Lower Pacific Mills, where he oversaw the complete rebuilding of the main mill and its power plants and the rearrangement of all machinery. In 1886, he published *Notes on Mill Construction*; in 1887, he became superintendent; in 1891, he went into private practice as consulting engineer and designer of mill buildings. In 1893, he formed a Boston-based partnership lasting until 1907, at which point he founded the Boston engineering firm of Charles T. Main, Inc., which was in operation as recently as 2007. Starting in 1899, Main supervised construction of all new plants for the new American Woolen Company. Main's distinguished career extended into the 1930s. In addition to work on mills his firm designed nearly 80 hydroelectric plants. He was very active and highly honored in his profession; MIT's Charles T. Main Textile Research Laboratory is named for him.

1885-1912

By 1880, Lawrence boasted more than 40,000 residents; by 1910, it had 86,000, of whom 41,300 came from 51 countries: 6,700 Italians, 4,300 Russians, and 2,100 Turks had joined the Irish, English, Scotch, Germans, and French Canadians. By 1905, Lawrence had the highest percentage of foreign-born citizens in the state, at 46%.

Extant buildings along the canal show the impact of changes in the 1880s and 1890s: new fire regulations, new forms of power (including electricity), and larger manufacturing equipment. By the turn of the century, conglomerates dominated the once-decentralized ownership of the mills. As companies expanded, development jumped across the canal, and boardinghouses were razed for the construction of new weave sheds and storehouses.

Wider mills, accommodating the heavier machinery of the 1880s onward, replaced the narrow structures of the previous decades. The wider buildings required larger windows for improved light and advanced heating systems to compensate for heat loss. The introduction of reinforced concrete to mill design at the turn of the century marked the final phase of 60 years of evolution of mill construction in the district.

During the last half of the 19th century, new mill sites were developed and old ones rebuilt. Boardinghouses north of Canal Street were razed for the construction of new mills and storehouses, and mill operatives found housing farther from the workplace. The three-decker apartment house appeared in Lawrence at the turn of the century; larger tenements of four or more units absorbed the growing population. Lawrence struggled with a high death rate and numerous public health problems, largely arising from tenement overcrowding.

(continued)

In 1893, during a national depression, all Lawrence mills temporarily ceased production with the reduction of protective tariffs and the consequent influx of cheap foreign goods. Recovery over the following years saw a peak of wages and output in 1909 and the rise of the conglomerates, notably the American Woolen Company. Although the North Canal remained the center of Lawrence's textile and paper industry, the south bank of the Merrimack was the site of a large amount of new development, including the mammoth Wood Mills (1905-1906), Ayer Mills (1908-1909), and Prospect Mills (1909). At the same time, the Arlington Mills were built to the east along the Spicket River.

In the 1880s and 1890s, cast-iron and timber construction methods were abandoned in favor of fire-retardant construction techniques, with large wall areas given to windows. In the period from 1880 to 1925, a utilitarian architectural style prevailed. The flat-roofed, large-windowed weaving sheds and storehouses of the late 19th century have uniform facades of segmental-arched or rectangular windows deep-set between undecorated brick piers or pilasters. The 1890 **George Kuhnhardt Woolen Mill #1** (Map 55), typical of this style, has a tower that remains one of the landmarks of the district.

The Pacific Mills were constructed in pressed red brick in the flat-roofed, utilitarian style favored by fire insurance companies. At the Pacific Mills Upper Canal Site, the new Renaissance Revival office of 1886-1887 and the utilitarian weave shed of 1890 prefigured the widespread razing of boardinghouses for new mills and storehouses built north of the canal. Improvements to the Pacific Mills complex included an 1895 Worsted Mill (now the site of the Fenton Judicial Center, Map 24) and the 1911 **Lower Pacific Finishing Mill** (Map 22). The Pacific Mills of the last decade of the 19th century were outfitted with the "plenum" ventilation, heating, and humidification system developed by B. F. Sturtevant of Boston. Vertical brick flues were built on top of exterior brick piers, carrying warmed air throughout the mill. Heaters and blowers were located in the basement.

In 1886-1887, the Washington Mills Company rebuilt on the original Bay State Woolen Mill site with a three-building complex (Map 26, 27, 32) that included a 250 feet chimney which was the second tallest in New England. Two of the mills, 400 feet long and 104 feet in width, were first thought to be too wide, but soon were exceeded by other structures. The Washington Mills had the largest woolen mill in the United States until the 1890s, when manufacture shifted to worsteds.

When the conglomerate American Woolen Company, led by William M. Wood, absorbed the Washington Mills in 1899, Charles T. Main began a campaign of construction and reconstruction on a larger scale, utilizing new materials and techniques. Between 1909 and 1925, the company built a reinforced concrete addition to the Washington Worsted Mill. This building, the **American Woolen Company Mill #7** (Map 28), was among the first large-scale applications of reinforced concrete along the canal. The new material offered fire protection, durability, lightness, freedom from vibration, and lower insurance rates. Steel provided the tensile strength and allowed greater areas to be devoted to windows. The expansion allowed the Washington Mills to increase production of men's wear: by 1920, the company employed 6,500 persons, and the parent American Woolen Company owned 50 mills and employed 35,000 persons.

The Pemberton and Lawrence Duck Mills remained smaller-scale operations, but added to their physical plants. The Pemberton Mills constructed two storehouses on Canal Street opposite the main mill, including the ca. 1890 **Pemberton Office and Warehouse #3** (Map 35). Until its closing, the **Duck Mill** (Map 44) continued producing their specialty cotton duck, used particularly in sails.

(continued)

In the 1890s, the Everett Cotton Mills began a series of improvements on the Essex Company Machine Shop yard that culminated in the 1909 construction of the monumental six-story, 650 feet by 75 feet **Everett Mills Company Weaving and Spinning Mill #5** (Map 46). The last of the large-scale brick mills to be constructed along the canal, it retains its integrity, including its landmark granite-trimmed central pavilion and clock.

At the turn of the 20th century, the district began to see product diversification, including the manufacturing of paper and large-scale wholesale baking. Paper manufacture in Lawrence was dominated by the William Russell Company, which expanded from a Prospect Street site to property in the district east of the Everett Mills. By applying Volker's patented process for using wood pulp, the firm became a leading manufacturer of coated papers for books and periodicals, including, for many years, the *National Geographic* magazine. Champion International Paper Company purchased the Russell firm in 1900. The buildings of the 1½-acre complex (Map 71) were contaminated and in ruins by the 1980s and have since been cleared to make way for the Gateway Project—the City of Lawrence's plan for developing the area as a gateway to downtown.

The **Morehouse Bakery Building** (Map 33) was built in 1907 (with later additions) as a wholesale baking firm. The entire business operations of the company—from administration to production to transportation—were consolidated under one roof. The bakery operated here continuously until 1976, employing many people who might not have found work otherwise—especially in view of the massive textile-manufacturing strikes of 1912 and of 1919 and subsequent faltering of the textile industry. In addition to its importance as an employer, the Morehouse Bakery made bread by the ton, feeding many people in Lawrence and the Merrimack Valley. The bakery also made cakes and doughnuts that were distributed throughout the regional market of eastern Massachusetts and into New Hampshire.

From its inception, the bakery was a modern operation that made early use of gas-powered trucks to establish reliable distribution throughout eastern Massachusetts and southern New Hampshire. In addition, the entire process of bread-making here was well documented by the young daughter of the owner in the 1920s, providing a vivid and accessible history.

John D. Morehouse and Charles W. Smith founded the company in 1900 and did business on Essex Street before purchasing the corner lot here in 1906. The firm stayed in family hands until it was sold in 1965 to Seaboard Flour Corporation, which operated the bakery until 1976.

The building contractor in 1907 was Ephraim A. Peabody & Son, a firm run by E.A. Peabody (1832-1916), then 75 years old, a local masonry contractor who had built other notable buildings in Lawrence and environs, including the YMCA building (NRDIS), Saint Laurence's Church and the Bay State Building (NRDIS). His sons John and Charles had joined him in the firm just before they won the contract to build the Morehouse Bakery.

The land at the corner of Mill and Methuen streets had never been developed because the Essex Company prohibited construction on the south side of Essex Street until the northern side had been built out. The Morehouse Baking Company did not own the adjoining parcels at the time of construction. To the west of the site was a three-story tenement building and there were other structures to the north of the site, per the atlas of 1876. After the main building went up in 1907, the company added a one-story, wooden loaving shed to the west side of the building, and a one-story wooden garage to the

(continued)

west side of the shed (per 1912 atlas). In 1914, the firm hired A.W. Lang & Company, masonry contractors, to build the three-story addition on the west side of the original building, on the site of the loaving shed. By 1924 another expansion was needed, so the buildings to the north—two three-story structures and a two-story barn—were razed to make way for the addition. This addition was built by E.A. Peabody & Sons, contractors, who would also construct the 1929 two-story garage section as well. Three row houses were demolished in 1931 to make way for a one-story garage, the final section of the complex.

The Morehouse Baking Company remained in business for three generations of ownership, employed hundreds, fed millions, and outlasted the neighboring textile manufacturers. As a successful enterprise that made a major, long-term contribution to the manufacturing history of the district, the Morehouse Bakery Building may well have been the best and last of its kind.

In addition to product diversification, the turn of the 20th century brought major advancements in sanitation. The work of Hiram F. Mills (1836-1921) and his team in defeating typhoid fever in the 1880s and 1890s had a major impact on the development of sanitary standards in mill complexes, and this earned him recognition as the father of American sanitary engineering. Typhoid fever was a recurring plague of the 19th century, caused by drinking water contaminated with human waste. Mills, a hydraulic and sanitary engineer, was a Maine-born graduate of Rensselaer Polytechnic Institute in 1856 and the son of a physician. His early career was spent in designing and supervising the construction of tunnels and dams, and by 1868 he had opened an office in Boston. He consulted as chief engineer for mill companies in Lowell and in Lawrence, where, among other things, his flow experiments produced greater turbine power.

As consulting engineer to the Boston Metropolitan Water & Sewage Board, he developed a great interest in clean water, that led to his work at the **Lawrence Experimental Sanitation Station**, which stood on Island Street (not extant, map #64). In 1887, Mills and his team developed the model for microbial filtration as applied to an existing large urban area. Previously only a theory, the "intermittent dosing" technique—in which river water was pumped to an elevated reservoir and released to return to the riverbed through the soil—was first applied in Lawrence. It eventually resulted in an 88% decrease in deaths from typhoid fever across the state.

The research work of Mills, published in 1890 by the Massachusetts Department of Health, gave the world a definitive account of soil-microbial activity as a destroyer of sewage bacteria, and cleared the way for sanitary engineers to treat water in urban environments everywhere. The original laboratory, built on Island Street in 1886, had been demolished by 1950. The original filter beds were abandoned, although photographs of them exist. In 1952-1953, a new laboratory and office structures were built outside of the district on the south bank of the Merrimack River near the footing of the dam. The original site— now a vacant lot— is part of the City of Lawrence's plan to develop the area as a gateway to downtown.

1912-1945

After 1912, the North Canal mill area mirrored the economic changes occurring in the New England textile industry. The standard of living was rising; the workers were demanding better wages and conditions, demands that were heavily resisted by the textile industry. There had been little labor-union activity in the wool industry since 1881, when the manufacturers' attempt to reduce wages had resulted in a strike. In 1912, the now-famous "Bread and Roses" strike transpired in Lawrence,

(continued)

hastened by the 54-hour workweek law passed by the state legislature, which reduced work hours for men as well as the intended group of women and children. The strike activities, including violent demonstrations, lasted from January 10th to March 14th and involved 27,000 operatives. Lawrence's newest immigrant workers, including Italians and Syrians, gave large support to the strike, which produced a general wage increase and drew national attention to child labor issues as well as workers' poor living conditions.

The first two decades of the 20th century were marked by steep fluctuations in the profitability of the textile industry. The Pacific Mills bought the Atlantic Cotton Mills—whose spinning machinery had gone into operation in 1849—at an auction in 1913. Other Lawrence manufacturers were adding new buildings and renovating old ones simultaneously. During World War I, wages increased and work hours were reduced as production zoomed due to wartime demands, especially for blankets and uniforms. In 1918, the **Central Bridge** (now the Joseph Casey Bridge, Map 18) opened and electricity was added to the city streets—both developments reflected the fact that Lawrence's population was increasing and that the city had become the unrivaled world leader in the manufacture of worsteds. The strike of 1919, led largely by women, resulted in the adoption of a 48-hour workweek and a 10% pay increase. It also raised the national socio-political awareness of the power of women in the workplace, a change of consciousness that helped lead to the enactment of women's suffrage. Strikes in 1922 and 1925 led to further improvements in working conditions.

The postwar boom in consumer markets led to expansion of textile operations and new storehouse construction for the American Woolen Company designed by Charles T. Main. Adjoining the Worsted Mill (1886) the company built the large **Washington Mills Company Building #6** (River Mill, Map 32) in 1887 and the **American Woolen Company Mill #7** (Map 28) in 1922. With this expansion, the Washington Mills were able to increase their production of menswear. Reinforced concrete and glass were the exterior materials used on the flat-roofed, ten-story **American Woolen Company Storehouse #10** (Map 29) in 1919, the last of the large mill buildings to be constructed along the canal.

Throughout the 1920s, worsted woolen goods remained the leader in textile manufacturing, followed by cottons, though the Atlantic Cotton Mills closed its doors in 1926. Paper manufacturing continued as a flourishing business along the North Canal at the site of the **Russell/Champion International Paper Co. Mills** (not extant, map 71). One of a half-dozen Lawrence firms to manufacture papermaking machinery, an important subsidiary industry, was the **Hamblet Machine Company** on Island Street (Map 60).

The Great Depression, beginning with the stock market crash in 1929, had a negative impact on Lawrence's manufacturing jobs. Long-standing companies that had not been well managed went under, starting with the Everett Cotton Mills and the Pemberton Mills. Others cut back on production and employment, trying to find a level of production that could be sustained while still making a profit. Throughout the 1930s, as everywhere else in the nation, Lawrence experienced hard times. The workers struck in 1931 but could not bring about concessions from the owners, whose businesses were faltering badly. The Works Progress Administration (WPA), the largest of President Roosevelt's New Deal agencies, came to the rescue of many unemployed mill workers. Hourly wages prevailed for anyone who needed a job, most involving public improvements, including construction of highway and road projects, public buildings, and public utilities.

(continued)

At last, in the late 1930s, the market began to return for worsteds. America's burgeoning involvement in World War II created an ongoing need for large quantities of blankets, uniforms, and tents, and this demand transformed Lawrence into a boomtown once again. Throughout the war, Lawrence factories hummed with activity as production levels soared. By 1945, Lawrence had reached historic highs of employees (25,843), wages paid ($55 million), and the value of the goods produced ($221.7 million).

1945-present

As soon as World War II ended, the mill owners, awash in profits, began making plans to move their manufacturing facilities south. They had long used the possibility of such a move as a threat to New England workers, for the southern states' right-to-work laws and lower standard of living meant less expenditure for the manufacturers. However, previously the South had relatively poor infrastructure, and without the necessary roads, highways, trains, bridges, and tunnels, they could not get the materials in or the product out in an efficient and cost-effective manner. The Federal Government's investment in infrastructure through WPA projects had transformed many regions in the South, and the manufacturers had noticed. Mill owners also wished to avoid making large capital investments in renovating older Lawrence buildings when they could build more efficient plants from scratch. Manufacturing remained in Lawrence through the 1940s, but in the 1950s operations rapidly moved southward. In 1957, the Pacific Mills, the last great Lawrence textile concern, closed its doors. Other, smaller companies stayed in business, but by 1962 the number of Lawrence factory workers stood at 13,000, only half of the number employed in 1946.

Alternate industries have occupied some of the mills, but most of the former industrial space has remained vacant. Several buildings within the historic district boundary were demolished in the 1950s and 1960s, as well as a few others since the district was originally listed in 1984. Despite these losses, the integrity of the district remains. As textile manufacturing declined, the Morehouse Bakery Company and its successor continued to produce and sell bakery products until 1976.

In the 1980s, developers began to see the district as an attractive locale for targeted development projects. Historic buildings have been rehabilitated for retail and residential purposes, raising the level of awareness of the district's history and the value of its architectural integrity. In 1985, the **Lawrence State Heritage Park** (Map 34) was created and the former **Bay State Woolen Mills Boarding House** (Map 30) was renovated as a Park Visitor Center with excellent interpretive exhibits (architect: Robert A. Zarelli, 1985). In 1995 the **Museum Square Parking Garage** was constructed (Map 24-I) and the large three-story **Fenton Judicial Center** was erected (Map 24).

Archaeological Significance

Historic archaeological resources described above may contribute important architectural, technological, and social information responsible for the 19th-century development of Lawrence as one of America's leading planned textile centers.

Historical research combined with archaeological survey and testing may locate evidence of agricultural land use in the district prior to 1845, a period when the district was characterized as riverbank farmland. Remnants of stone walls, animal pens, and agricultural-related outbuildings may exist within the boundaries of the proposed district.

(continued)

Cartographic research combined with archaeological testing may also help to identify the original land surfaces in the district. Historic maps and soil coring may help identify portions of the district that have been reconfigured with future building sites created by dredged "new" land.

Historical and archaeological resources may contribute important information related to the evolution of waterpower technologies in the district and its relationship with industrial evolution. Historical and archaeological research may identify design components and construction techniques used to build the Great Stone Dam and North Canal, both sources for the district's mechanical power. Similar research combined with careful and detailed mapping may also identify the complex system of mill canals that delivered water to the mills, and then returned it to the Merrimack and Spicket Rivers. Historical and archaeological research may also contribute important information related to the evolution of waterpower technologies in the district from the use of overshot wheels to turbines. Important information may also exist that identifies the adaptative reuse of waterpower resources as direct systems of waterpower changed to the use of steam then electrical power.

Historical and archaeological research may also contribute important information related to the manufacturing technologies used at individual mills. Detailed analysis of industrial trash deposits may contribute information related to the evolution of cotton and wool textile technologies used at mills in the district and the objects that were manufactured. Information related to tool making and machinery manufacture may also exist at mill sites and related archaeological features associated with the Essex Company (ca. 1846), one of the earliest mills in the district.

Historical and archaeological research at extant boarding houses and archaeological sites may contribute important information on the social, cultural, and economic characteristics of factory workers and the relationship between company owners and their workers. Structural evidence of outbuildings and detailed analysis of the contents of occupational-related features may contribute important information related to worker family structure in boarding and tenement houses, ethnicity, and methods of supplementing wages earned in factories. Some level of subsistence farming and/or husbandry and cottage industries may have been employed by factory workers at their homes to increase food supplies and create additional income. Historical and archaeological information may also exist that indicates the extent that workers were dependant on company stores for food and other goods and services.

(end)

"A Photographic History of the Senator William X. Wall Experiment Station." Massachusetts Department of Environmental Protection: www.mass.gov/dep/about/organization/early1.htm.
Dalzell, Jr., *Enterprising Elite: The Boston Associates and the World They Made* (Cambridge, 1987).
Dictionary of American Biography: Charles S. Storrow.
Dictionary of American Biography: Charles T. Main.
Dictionary of American Biography: Hiram F. Mills.
Dorgan, Maurice B. *Lawrence Yesterday and Today*. 1918.
Dorgan, Maurice B. *The History of Lawrence, Ma*. 1924.
Essex Institute Historical Collections vol. 107 (Essex Institute, Salem, Mass., 1971) "Textile Mill Architecture in East Central New England," by Bryant F. Tolles.
Lawrence Heritage Park Master Plan report, 5 Nov. 1981.
Massachusetts Historical Review, 2000: "Father of the While Enterprise," by Prof. Peter A. Ford.
Morehouse, Gladys E. "The Morehouse Baking Co." Eighth Grade School Report. John B. Rollins School, 1927. (on file with this nomination at MHC)
Richards Map Company, Atlas of Lawrence, Methuen, Andover and North Andover. 1906, 1926.
Rushforth & Donoghue, *Lawrence Up To Date 1845-1895*. 1895.
Sandburg, Louise Brady. *Images of America: Lawrence in the Gilded Age*. Arcadia Publishing, Portsmouth, New Hampshire. 2004.
Skulski, Ken. Images of America: *Lawrence Massachusetts Volume II*. Arcadia Publishing, Portsmouth, New Hampshire. 1997.
The Lawrence Survey, 1912.
Wadsworth, H.A. *Quarter Centennial: History of Lawrence*. 1878.
Whipple, George C. (Ed). *State Sanitation*. "Typhoid Fever in Its Relation to Water Supplies," by Hiram F. Mills, 1900. Harvard University Press, Cambridge. 1917.

Verbal Boundary Description

The boundaries of the North Canal Historic District (Boundary Increase) are delineated with a red line on the attached map entitled, "North Canal Historic District." They are also outlined in pencil on the accompanying assessor's maps. The bridges crossing the canal that are listed on the district data sheet are included in their entirety.

Justification

Revised boundaries for the North Canal Historic District (Boundary Increase) were selected to include the remaining industrial manufacturing building that was previously left outside the district. Other lots surrounding the district were evaluated to determine if their inclusion was appropriate. One block north, along Essex Street, is the Essex Street National Register District that does not relate to the current district. East of the district, across the Spicket River and along Prospect Street, are residential areas with houses primarily from the late 19th century through the 1970s. The southern boundary is the Merrimack River. To the west of the district, across Broadway, are several industrial mill buildings that do not relate to the district. Set back from the street are a number of commercial structures dating to the 1980s that do not relate historically or physically to the district.

(end)

PHOTOGRAPHS
Photographer: Sarah Hansen, AHF

Photos 1-22 are supplementary images of previously listed properties in the North Canal HD. Photos 23-28 are images of the Morehouse Bakery Building boundary increase.

1. East elevation of Gate Keeper's House (map 3)
2. Pacific Cotton Mill, south elevation (map 4-I)
3. Pacific Cotton Mill, Atlantic Mill Co. Spinning Mill #3 (map 4-I, 8, 9), looking north
4. Family Service Inc., north elevation (map 6)
5. 454 North Canal Street, north elevation (map 7)
6. Upper Pacific Cotton Yarn Mill #5 Storehouse, looking south (map 11, 12)
7. Upper Pacific Storehouse #7, south elevation (map 15)
8. Central Bridge Approach, looking southeast (map 18-I)
9. Lower Pacific Finishing and Packing Mill, Washington Mills Bridge, north elevation (map 23, 76)
10. Atlantic Cotton Mills Boarding House, Central (Casey) Bridge, south and east elevations (map 17, 18, 18-I)
11. Fenton Judicial Center, Lower Pacific Bridge, Washington Mills Bridge, looking north (map 24, 24-I, 25, 76)
12. American Woolen Company Dye House, Washington Mills Building #1, south elevation (map 26, 27)
13. Washington Mills Building #1, north elevation (map 27)
14. American Woolen Company Storehouse #10, Bay State Woolen Mills Boarding House, looking north (map 29, 30)
15. Washington Mills Company Building #6 (River Mill), north elevation (map 32)
16. Pemberton Company Office and Warehouse #3, Stable, south and east elevation (map 35, 37)
17. Pemberton Manufacturing Company Mail Mill, Lawrence Duck Company Mill #3, Pemberton Mill Bridges, north and west elevation (map 42, 44, 77, 78)
18. Everett Mills Company Weaving and Spinning Mill #5, south and west elevation (map 46)
19. Everett Mill Storehouse #6, Essex Company Mill #1, south and west elevation (map 52, 48)
20. George Kunhardt Woolen Mill #1, Woolen Shop and Boiler House, and Mill #9, looking west (map 55, 56, 58)
21. Broadway Bridge (O'Leary Bridge), looking north (map 72)

22. Pemberton Mill Bridge, Washington Mills Company Building #1, Pemberton Manufacturing Company Main Mill (map 32, 42, 77)

23. Morehouse Bakery, southeast corner
24. Morehouse Bakery, southwest corner
25. Morehouse Bakery, north elevation
26. Morehouse Bakery, south elevation
27. Morehouse Bakery, east and north elevations
28. Morehouse Bakery, east elevation

North Canal
District Data Sheet

Lawrence (Essex), MA

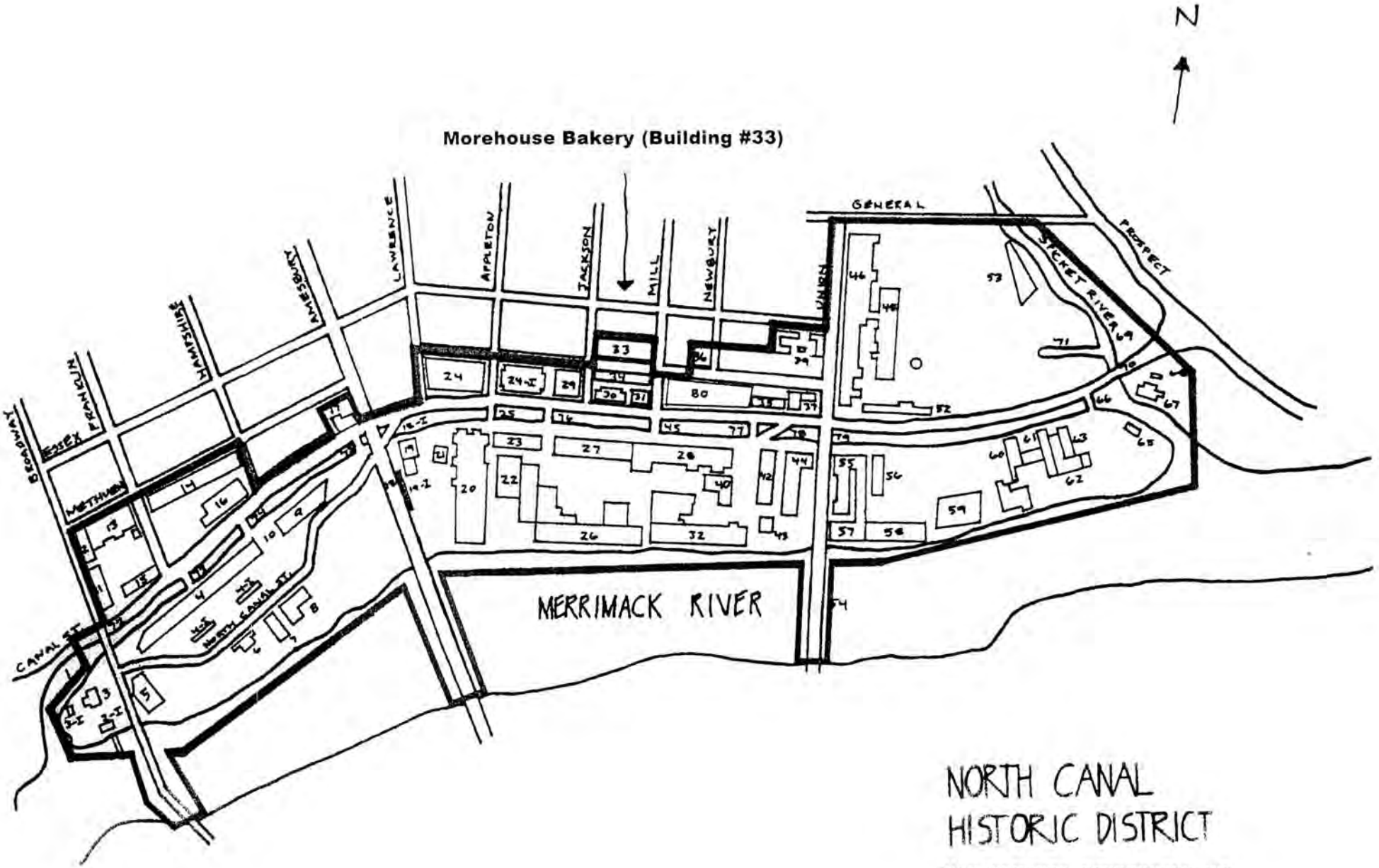
Map #	Street Number	Property Address	Historic Name	Date	Maker	Construction	Resource Type	Status
1		Along Canal Street	North Canal	1848	Charles Bigelow	Random coursed granite	B/NR 1975	C
2		Merrimack River & MA 28	Great Stone Dam	1848	Charles Storrow & Gilmore Carpenter	Bluestone, Granite	B/NR 1977	C
2 - I		Broadway at Canal Street	Gatehouse at Great Stone Dam	1848	Charles Storrow	Wood Frame	B	C
3		Broadway	North Canal Gate Keepers House	1945		Wood Frame	B	C
3-I		Broadway	N Canal Barn	1848		Wood Frame	B	C
4	468	Canal Street	Upper Pacific Cotton Mill Weave Shed and Office	c. 1890, office 1887	George Moffette, Jr. (office)	Brick	B	C
4-I	468	Canal Street	Pacific Cotton Mill - Fragments (possible turbine houses)	1852		Brick	St	C
5	0	Broadway	Upper Pacific Storehouse #5	c. 1860	Charles Bigelow	Warehouse	B	C
6	430	N. Canal Street	Family Service, Inc.	1960		Brick	B	NC
7	454	N. Canal Street	New England Dough	1959		Brick and Slate	B	C
8	444	Canal Street	Kid Start	1955		Brick	B	C
9	400	Canal Street	Atlantic Mill Co. Spinning Mill #5	c. 1906		Brick	B	C
10		Between Hampshire and Franklin Streets	Site of Upper Pacific Bridge	1864	Thomas W.H. Moseley			V
11	1	Broadway	Upper Pacific Cotton Yarn Mill #5 Storehouse	1902		Brick	B	C
12	7	Broadway	Garage - former Goodyear store	c. 1890s		Brick	B	C
13	2	Methuen Street	Upper Pacific Yarn Mill	1896		Brick	B	C
14		Methuen Street	Upper Pacific Worsted Mill #10	c.1889		Brick	B	C
15	2	Franklin Street	Upper Pacific Storehouse #7	1896		Brick	B	C
16	433	Canal Street	New England Telephone	c. 1950		Brick	B	NC
17	401-403	Canal street	Atlantic Cotton Mills Boarding House	1847	Charles Storrow	Brick	B	NC
18		Foot of Amesbury Street	Central Bridge (now Joseph W. Casey Bridge)	1918	Benjamin Davis	Reinforced Concrete	St	C
18-I		Foot of Amesbury Street	Central Bridge Approach	1918	Benjamin Davis	Reinforced Concrete	St	C
19	300	Canal Street	Lower Pacific Cotton Mill	1883		Brick	B	C
19-I		Canal Street	Ruin	1883		Brick and Granite	St	C
20	300	Canal Street	Lower Pacific Worsted Mill	1864, 1877, 1908		Brick	B	C
21	300	Canal Street	Lower Pacific Boiler House & Engine Room	1885	Charles T. Main	Brick	B	C
22	300	Canal Street	Lower Pacific Finishing Mill	1911		Brick	B	C
23	300	Canal Street	Lower Pacific Finishing & Packing Mill	1882		Brick	B	C
24	361	Canal Street	Fenton Judicial Center	1995		New Construction	B	NC
24-I	365	Canal Street	Museum Square Garage	1995		New Construction	B	NC
25		Appleton & Canal Streets	Site of Lower Pacific Bridge	1870	Phoenix Iron Works	Vacant Lot		V
26		Canal Street	American Woolen Company Dye House	1887	Lockwood, Greene & Company	Brick	B	C
27	270	Canal Street	Washington Mills Building #1	1886/2007	Lockwood, Greene & Company/Durkee, Brown, Viveiros & Werenfels	Brick	B	C
28	250	Canal Street	American Woolen Company Mill #7	1887	Lockwood, Greene & Company	Brick and Concrete	B	C
29		Jackson & Canal Streets	American Woolen Company Storehouse #10	c. 1919	Charles T. Main	Brick	B	C
30	Two	Jackson Street	Bay State Woolen Mills Boarding House	1865		Brick and Stucco	B	C
31	1	Mill Street	American Woolen Co. Office	1900		Brick	B	C
32	250	Canal Street	Washington Mills Co. Building #6 (River Mill)	1887		Brick	B	C
33	5 to 9	Mill Street	Morehouse Bakery	1906-1931	E.A. Peabody & Son (1907, 1924, 1929); A.W. Lang & Company (1914)	Brick	B	C
34	One	Jackson Street	Lawrence Heritage State Park	1985		Brick	St	C
35	246	Canal Street	Pemberton Co. Office & Warehouse #3	c. 1890		Brick	B	C
36		Methuen Street	Walton School	c. 1860		Brick	B	C
37	6	Methuen Street	Pemberton Co. Stable	c. 1880		Brick	B	C
38	6	Methuen Street	Site of Pemberton Co. Stable addition	c. 1960		Vacant Lot		V
39	6	Essex Street	Essex Co. Offices and Yard	1883-1884	Hiram Mills	Brick and Wood fram	B/ NR 1979	C
40	250	Canal Street	Site of American Woolen Co. Power Plant	1923		Vacant Lot		V
41	250	Canal Street	Site of Bay State Mills Railroad Shed	1848		Vacant Lot		V

North Canal
District Data Sheet

Lawrence (Essex), MA

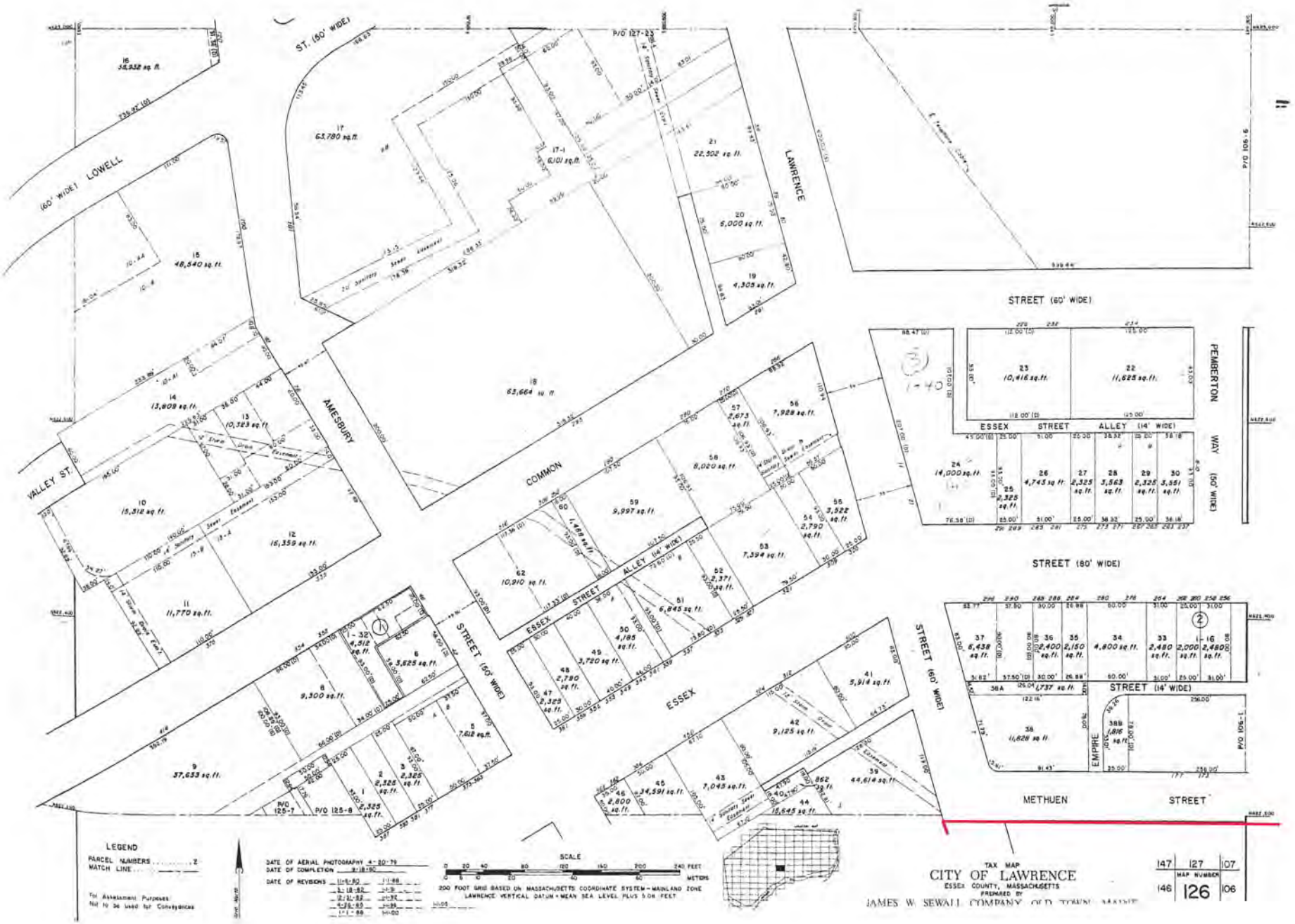
Map #	Street Number	Property Address	Historic Name	Date	Maker	Construction	Resource Type	Status
42	216	Canal Street	Pemberton Manufacturing Co. Main Mill	1860-61	Theodore Voelkers	Brick	B	C
43		Canal Street	Pemberton Mill Picker House	c. 1850		Brick	B	NC
44	4	Union Street	Lawrence Duck Company Mill #3	1853	Charles Bigelow/(Addition) Charles T. Main	Brick	B	C
45		Mill And Canal Streets	Washington Mills Canal Bridge	1923		Steel	St	C
46	15	Union Street	Everett Mills Co. Weaving & Spinning Mill #5	1909	William Hartley Dennett	Brick	B	C
47			Everett Storehouse #8	1900		Brick	B	C
48		Union Street	Essex Company Main Mill #1	c. 1846	Charles Bigelow	Brick	B	C
49	70	General Street	Everett Mill Co. Weaving Mill #4	1892		Brick	B	C
50	70	General Street	Site of Everett Mill Co. Mill Picker House & Extension	1892		Vacant Lot		V
51	70	General Street	Site of Everett Mill Co. Cloth Room	1892		Vacant Lot		V
52	183	Canal Street	Everett Mill Storehouse #6 (original Cotton Weaving Mill)	1863, 3rd Floor 1946		Brick	B	C
53	1	Canal Street	Everett Mills Storehouse	1905		Brick	B	C
54		Between Union and South Union Streets	Union (Duck) Bridge	1887	Warren Truss & George L. Vose-Boston Bridge Works	Steel and wood	St	C
55	60	Island Street	George Kuhnhardt Woolen Mill No. 1 & Office	c. 1890		Brick	B	C
56		Island Street	George Kuhnhardt Woolen Shop & Boiler House	c. 1896		Brick	B	C
57	50	Island Street	George Kuhnhardt Woolen Mill #4	1896-1899		Brick	B	C
58	51	Island Street	George Kuhnhardt Woolen Mill #9	1896-1899		Brick	B	C
59	50	Island Street	George Kuhnhardt Woolen Warehouse	1896-1899		Brick	B	C
60	30	Island Street	Hamblet Machine Company	1859		Wood Frame	B	C
61	30	Island Street	Ferrous Technology	1960		New Construction	B	NC
62	30	Island Street	Ferrous Technology	1978		New Construction	B	NC
63	30	Island Street	Ferrous Technology	1940		Metal	B	C
64		Island Street	Site of Lawrence Experimental Sanitation Site	1886		Vacant Lot		V
65		Island Street	Site of North Canal Lockkeeper's House	1848		Vacant Lot		V
66		North Canal Street	Locks And Wasteway	1845			St	C
67	1	Marston St	Russell Paper Storehouse	c. 1875			B	NC
68	1	Marston St	Lawrence Pump & Engine Co.	c. 1853		Wood Frame	B	C
69		Below Prospect Street Bridge	Spicket Penstock	c. 1855, rebuilt 1899, 1913	Charles Storrow		St	C
70		Canal Street, Near Spicket Wasteway	Prospect Street Bridge	c. 1855	Charles Storrow		St	C
71	21	Canal Street (at Spicket River)	Site of Russell, Later Champion International Paper Co. Mills	c. 1870		Vacant Lot		V
72		Broadway	Broadway Bridge (Edward O'Leary Bridge)	c. 1854		Steel	St	C
73		Franklin Street	North Canal Railroad Bridge	c. 1850		Steel & Brick	St	C
74		Canal, between Franklin & Hampshire	Upper Pacific Pedestrian Bridge	1849		Steel & Concrete	St	C
75		Amesbury	Pedestrian Bridge	Late 19th century		Steel & Wood	St	C
76	270	Canal Street	Washington Mills Building No. 1 Bridge	2007		Steel	St	NC
77		Canal Street	Pemberton Mill Bridge	c. 1902		Steel & Wood	St	C
78		Canal Street	Pemberton Mill Bridge II	Early 20th century		Steel	St	C
79		Union Street	Union Street Bridge (FWP)	1939	Federal Works Progress Administration	Concrete	St	C
80		Canal and Mill Streets	US Citizenship Center	2008-2009	US Department of Homeland Security	Brick veneer	B	NC

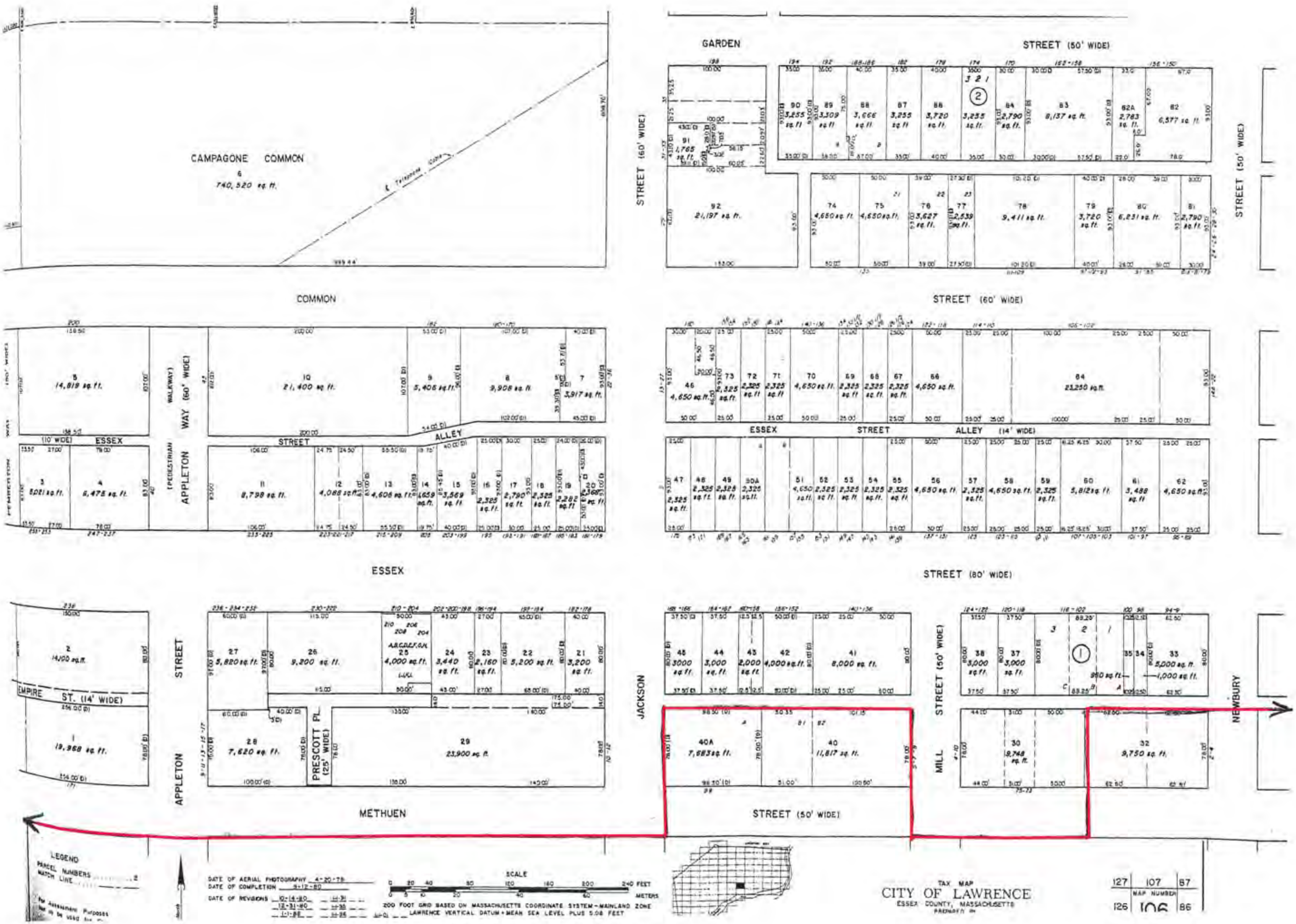
11/24/08 version



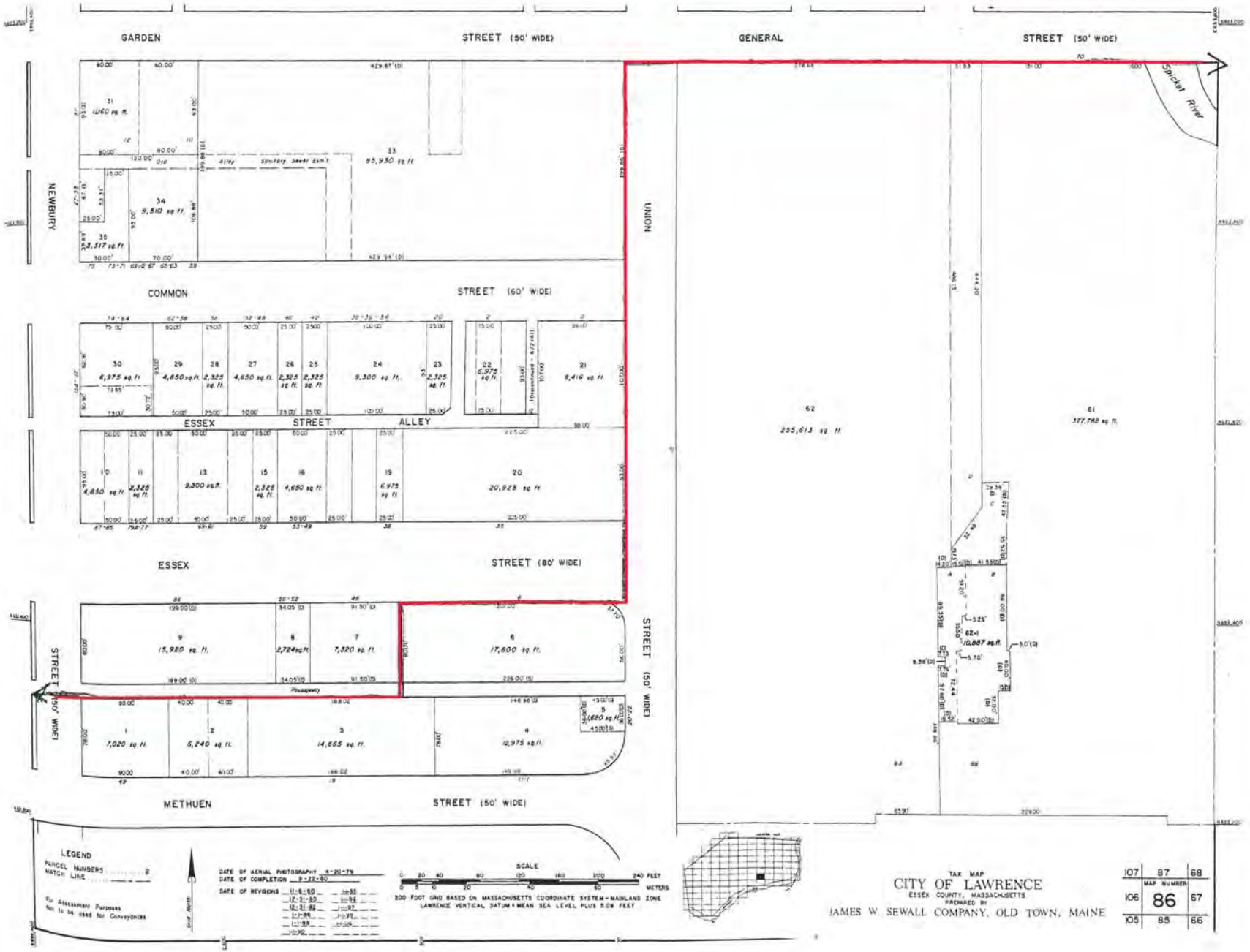
NORTH CANAL HISTORIC DISTRICT

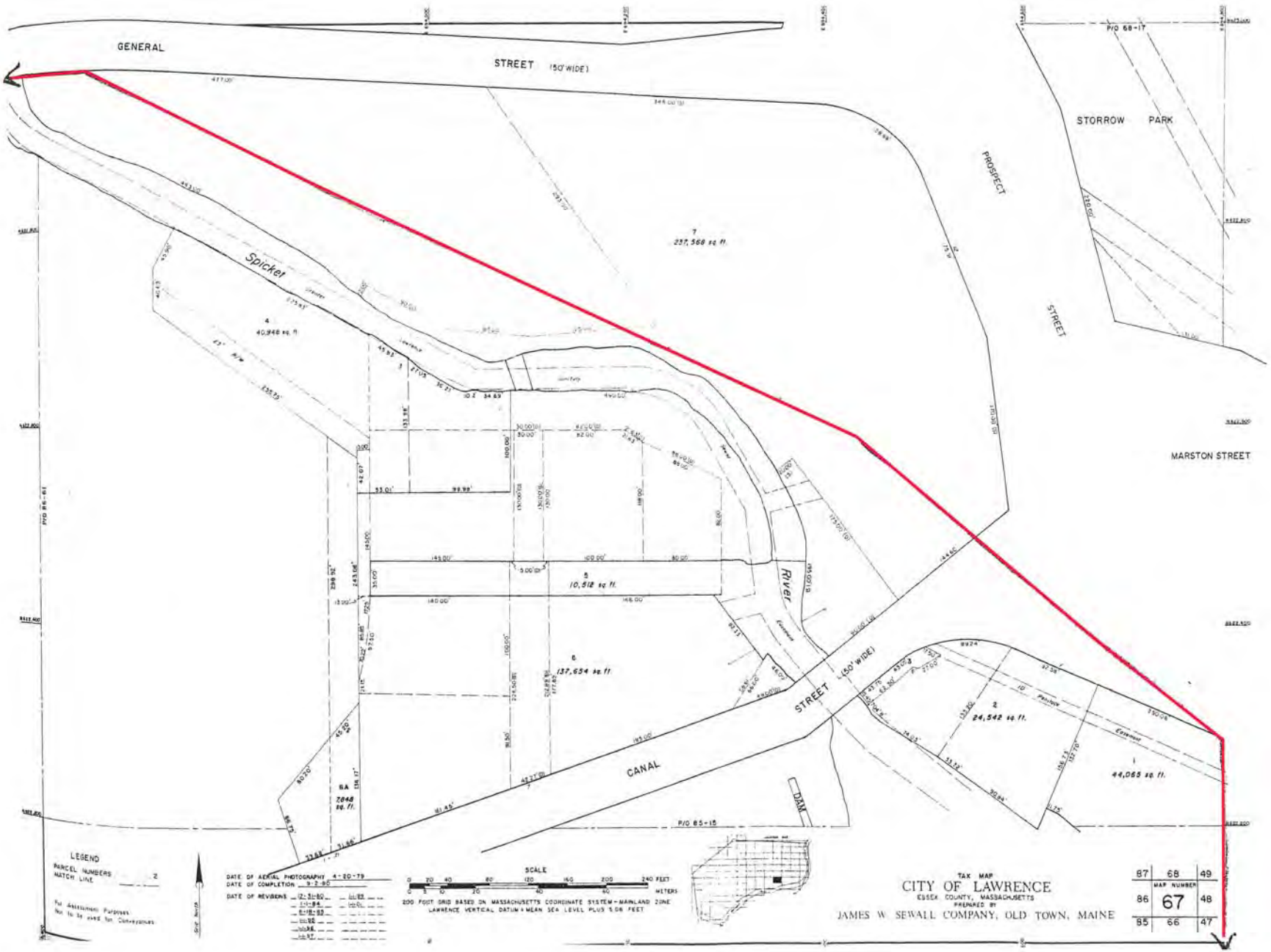
MAP NUMBERS CORRESPOND TO DISTRICT DATA SHEET

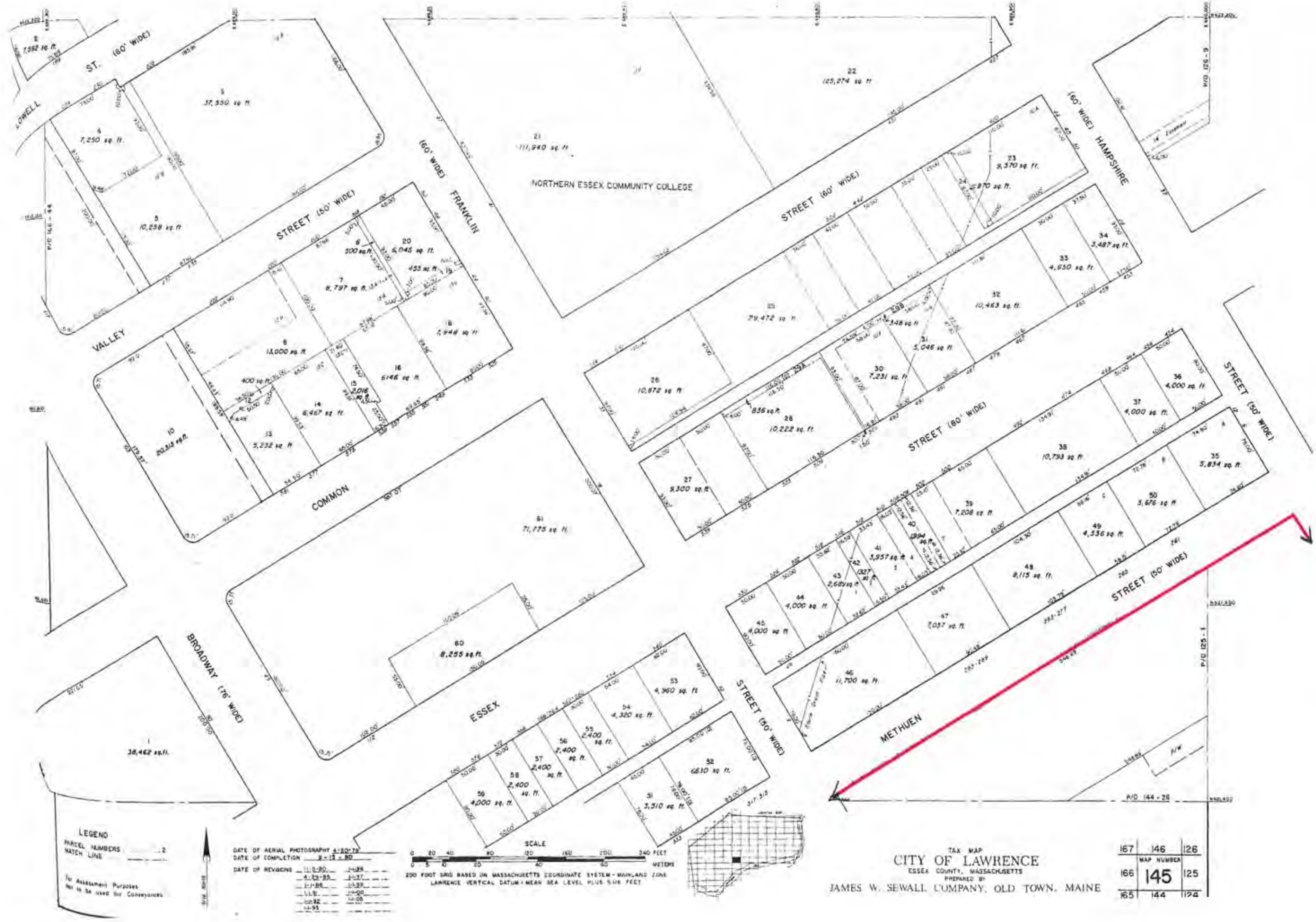

LOWELL (60' WIDE)
VALLEY ST.
AMESBURY
COMMON
LAWRENCE
STREET (60' WIDE)
ESSEX STREET ALLEY (14' WIDE)
PEMBERTON WAY (50' WIDE)
METHUEN STREET
EMPIRE
P/O 125-7
P/O 125-8
P/O 127-23
P/O 105-6
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-30-79
DATE OF COMPLETION 9-18-80
DATE OF REVISIONS 11-6-80 1-1-88
3-18-82 1-1-89
12-21-82 1-1-92
4-26-83 1-1-94
1-1-86 1-1-00
SCALE
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM - MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 5.04 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
147 127 107
146 126 106
MAP NUMBER



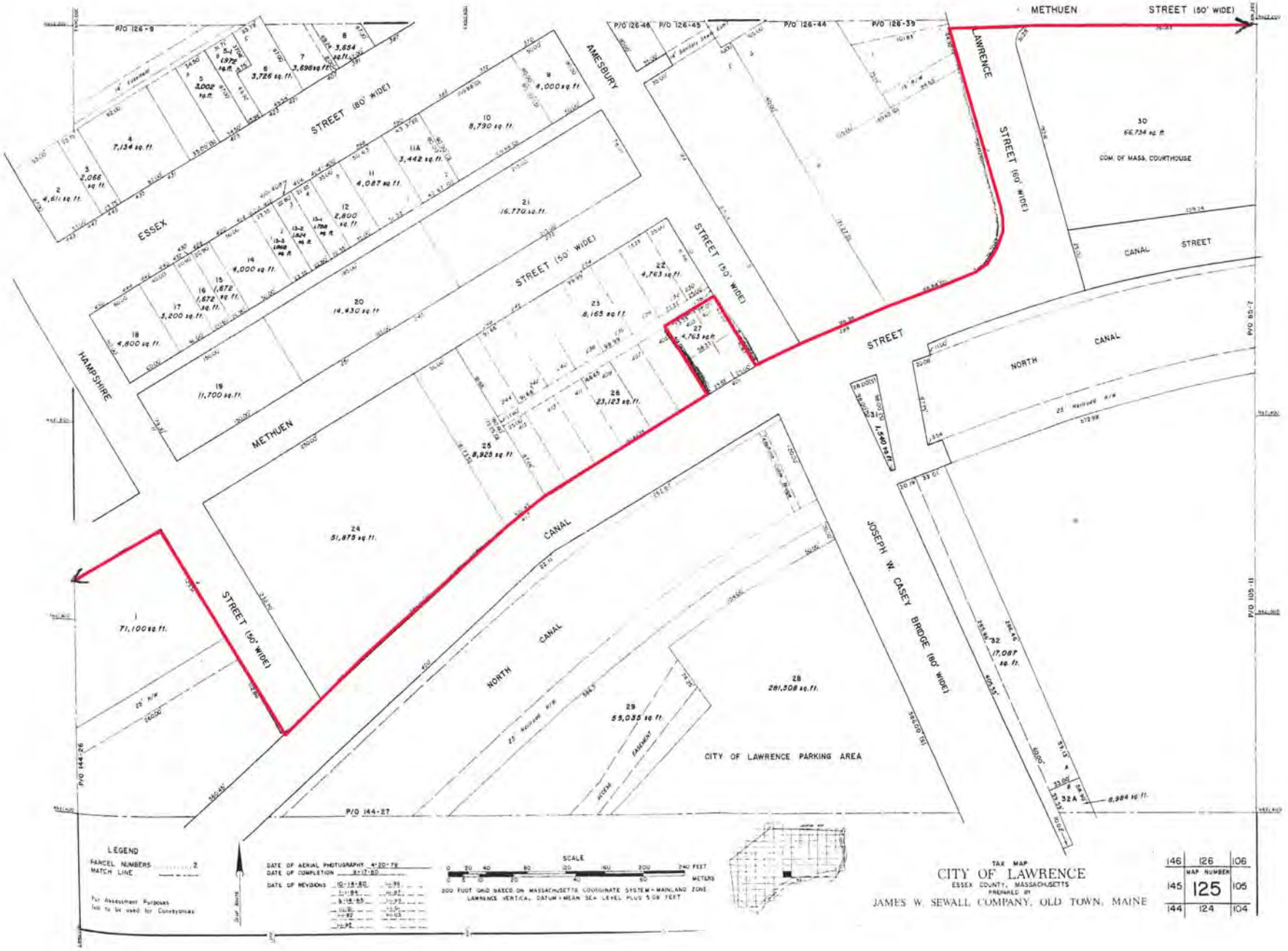
CAMPAGONE COMMON
6
740,520 sq. ft.
COMMON
GARDEN
STREET (50' WIDE)
STREET (60' WIDE)
STREET (60' WIDE)
STREET (50' WIDE)
92
21,197 sq. ft.
91
1,765 sq. ft.
90
3,255 sq. ft.
89
3,309 sq. ft.
88
3,666 sq. ft.
87
3,255 sq. ft.
86
3,720 sq. ft.
3,255 sq. ft.
84
2,790 sq. ft.
83
8,137 sq. ft.
82A
2,763 sq. ft.
82
6,377 sq. ft.
74
4,650 sq. ft.
75
4,650 sq. ft.
76
3,627 sq. ft.
77
2,539 sq. ft.
78
9,411 sq. ft.
79
3,720 sq. ft.
80
6,231 sq. ft.
81
2,790 sq. ft.
5
14,819 sq. ft.
(PEDESTRIAN WALKWAY)
APPLETON WAY (60' WIDE)
10
21,400 sq. ft.
9
5,406 sq. ft.
8
9,908 sq. ft.
7
3,917 sq. ft.
(10' WIDE) ESSEX STREET ALLEY
PEMBERTON WAY (10' WIDE)
3
5,021 sq. ft.
4
6,475 sq. ft.
11
8,798 sq. ft.
12
4,088 sq. ft.
13
4,606 sq. ft.
14
1,659 sq. ft.
15
3,569 sq. ft.
16
2,325 sq. ft.
17
2,790 sq. ft.
18
2,325 sq. ft.
19
2,282 sq. ft.
20
2,368 sq. ft.
46
4,650 sq. ft.
73
2,325 sq. ft.
72
2,325 sq. ft.
71
2,325 sq. ft.
70
4,650 sq. ft.
69
2,325 sq. ft.
68
2,325 sq. ft.
67
2,325 sq. ft.
66
4,650 sq. ft.
64
23,250 sq. ft.
ESSEX STREET ALLEY (14' WIDE)
47
2,325 sq. ft.
48
2,325 sq. ft.
49
2,325 sq. ft.
50A
2,325 sq. ft.
51
4,650 sq. ft.
52
2,325 sq. ft.
53
2,325 sq. ft.
54
2,325 sq. ft.
55
2,325 sq. ft.
56
4,650 sq. ft.
57
2,325 sq. ft.
58
4,650 sq. ft.
59
2,325 sq. ft.
60
5,812 sq. ft.
61
3,488 sq. ft.
62
4,650 sq. ft.
ESSEX
STREET (80' WIDE)
2
14,100 sq. ft.
EMPIRE ST. (14' WIDE)
1
19,968 sq. ft.
APPLETON STREET
27
5,820 sq. ft.
26
9,200 sq. ft.
25
4,000 sq. ft.
24
3,440 sq. ft.
23
2,160 sq. ft.
22
5,200 sq. ft.
21
3,200 sq. ft.
28
7,620 sq. ft.
PRESCOTT PL. (25' WIDE)
29
23,900 sq. ft.
JACKSON
45
3000 sq. ft.
44
3,000 sq. ft.
43
2,000 sq. ft.
42
4,000 sq. ft.
41
8,000 sq. ft.
40A
7,683 sq. ft.
40
11,817 sq. ft.
MILL STREET (50' WIDE)
38
3,000 sq. ft.
37
3,000 sq. ft.
35
34
33
5,000 sq. ft.
1,000 sq. ft.
850 sq. ft.
30
9,748 sq. ft.
32
9,750 sq. ft.
NEWBURY
METHUEN
STREET (50' WIDE)
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes Not to be used for ...
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 6-12-80
DATE OF REVISIONS 10-14-80 12-31-80
SCALE
0 20 40 80 120 160 200 240 FEET
METERS
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM-MAINLAND ZONE
LAWRENCE VERTICAL DATUM=MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
127 107 87
MAP NUMBER
126 106 86

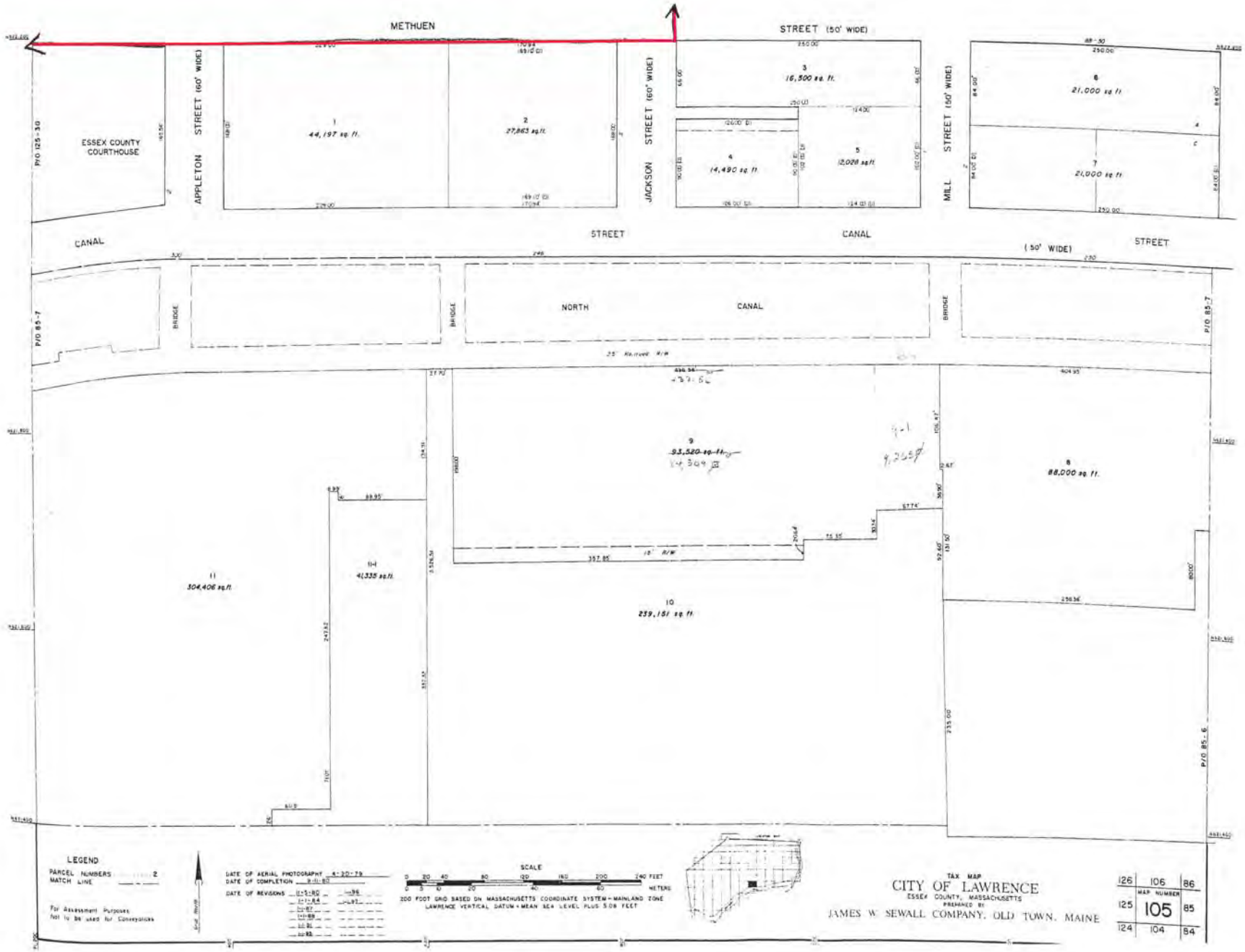

GARDEN
STREET (50' WIDE)
GENERAL
STREET (50' WIDE)
Spicket River
NEWBURY
UNION
COMMON
STREET (60' WIDE)
ESSEX
STREET
ALLEY
ESSEX
STREET (80' WIDE)
STREET (50' WIDE)
METHUEN
STREET (50' WIDE)
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes Not to be used for Conveyances
Grid North
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 9-22-80
DATE OF REVISIONS
SCALE
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM-MAINLAND ZONE
LAWRENCE VERTICAL DATUM-MEAN SEA LEVEL PLUS 5.04 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
MAP NUMBER
107 87 68
106 86 67
105 85 66

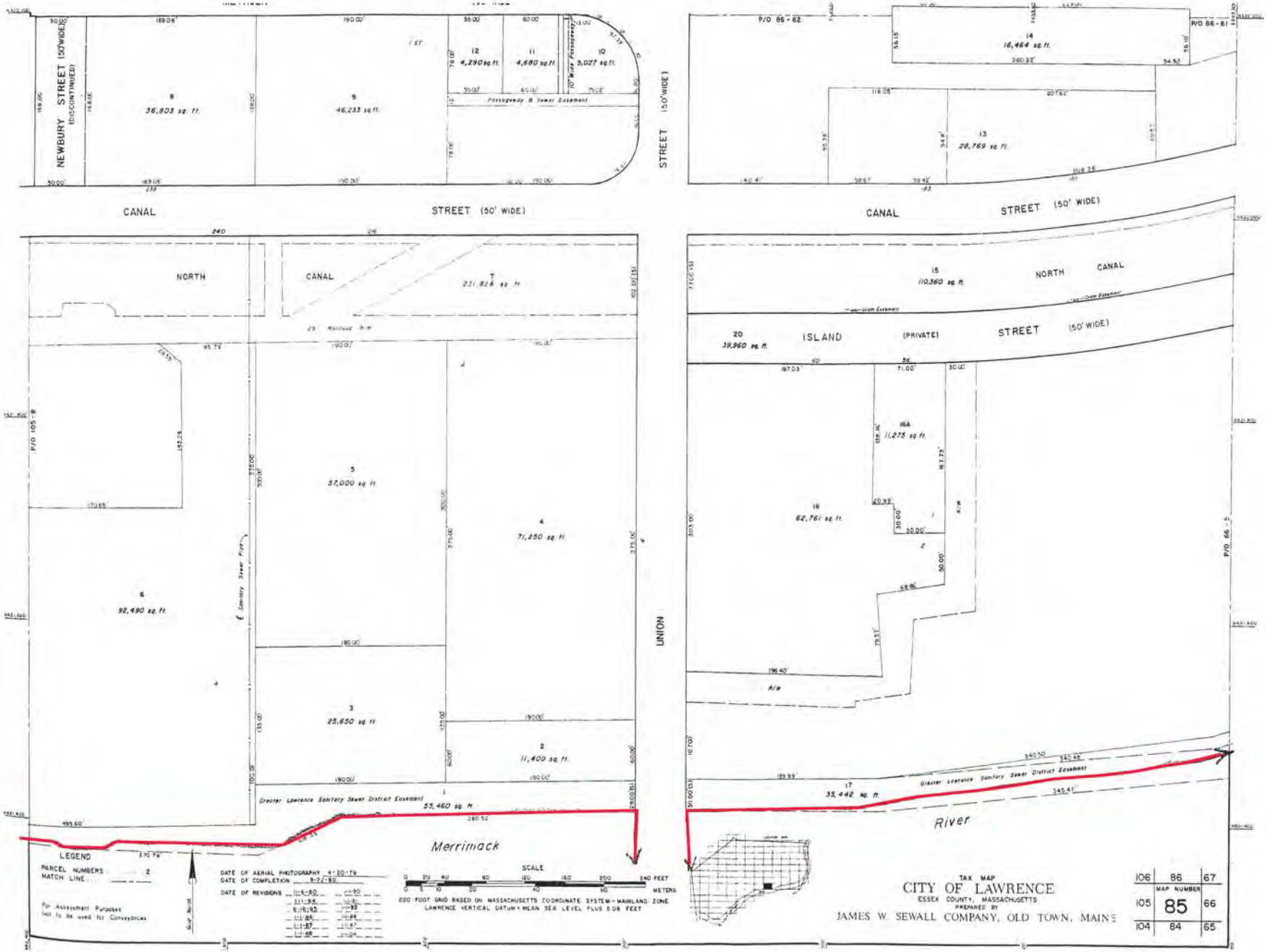

GENERAL
STREET (50' WIDE)
P/O 68-17
STORROW PARK
PROSPECT
STREET
MARSTON STREET
Spicket
River
7
257,568 sq. ft.
4
40,948 sq. ft.
5
10,512 sq. ft.
6
137,634 sq. ft.
6A
7848 sq. ft.
2
24,542 sq. ft.
1
44,065 sq. ft.
STREET (50' WIDE)
CANAL
DAM
P/O 85-15
P/O 86-61
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes
Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 9-2-80
DATE OF REVISIONS
SCALE
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM-MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
87 68 49
86 67 48
85 66 47
MAP NUMBER

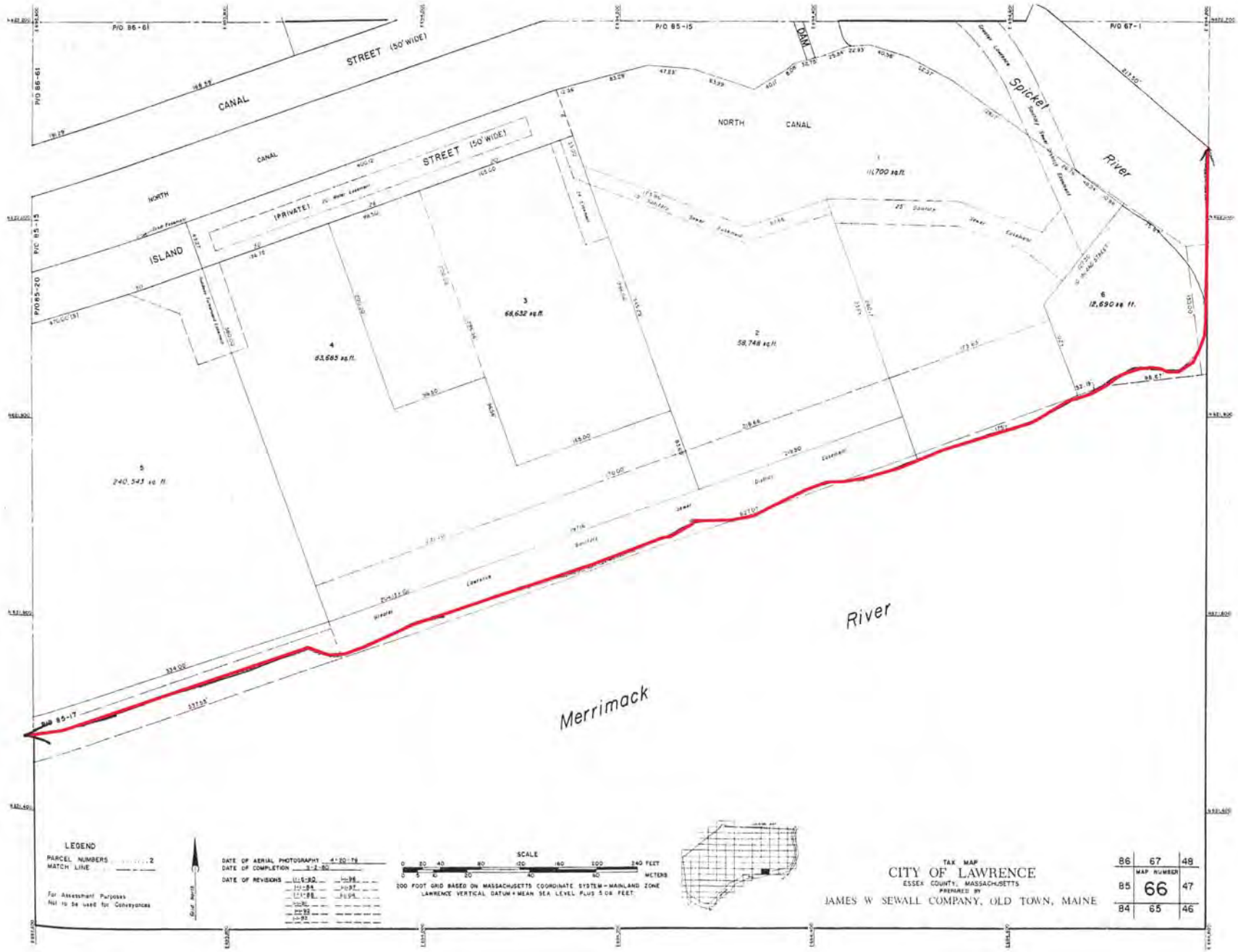


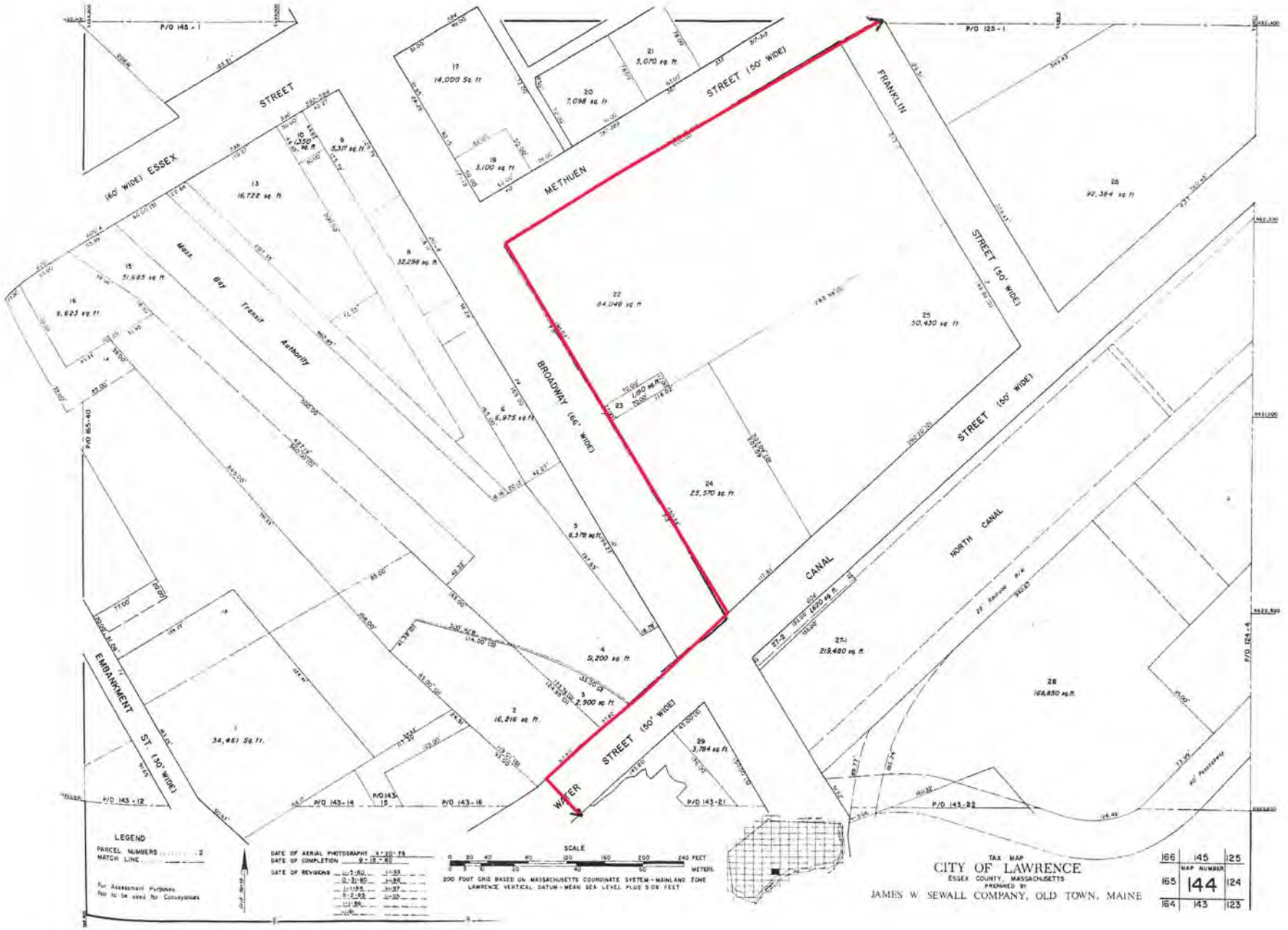
LOWELL ST. (60' WIDE)
VALLEY STREET (50' WIDE)
COMMON
ESSEX
BROADWAY (76' WIDE)
FRANKLIN (60' WIDE)
NORTHERN ESSEX COMMUNITY COLLEGE
STREET (60' WIDE)
HAMPSHIRE (60' WIDE)
STREET (80' WIDE)
STREET (50' WIDE)
METHUEN STREET (50' WIDE)
STREET (50' WIDE)
P/O 144 - 26
P/O 125 - 1
P/O 126 - 9
P/O 166 - 44
22 125,274 sq. ft.
21 111,940 sq. ft.
3 37,550 sq. ft.
4 7,250 sq. ft.
5 10,258 sq. ft.
2 7,552 sq. ft.
6 500 sq. ft.
7 8,797 sq. ft.
8 13,000 sq. ft.
10 20,313 sq. ft.
13 5,232 sq. ft.
14 6,467 sq. ft.
16 6146 sq. ft.
18 7,948 sq. ft.
20 6,045 sq. ft.
23 9,570 sq. ft.
25 29,472 sq. ft.
26 10,672 sq. ft.
27 9,300 sq. ft.
28 10,222 sq. ft.
30 7,231 sq. ft.
31 5,046 sq. ft.
32 10,463 sq. ft.
33 4,650 sq. ft.
34 3,487 sq. ft.
35 5,834 sq. ft.
36 4,000 sq. ft.
37 4,000 sq. ft.
38 10,793 sq. ft.
39 7,208 sq. ft.
41 3,957 sq. ft.
43 2,682 sq. ft.
44 4,000 sq. ft.
45 4,000 sq. ft.
46 11,700 sq. ft.
47 7,037 sq. ft.
48 8,115 sq. ft.
49 4,536 sq. ft.
50 3,676 sq. ft.
51 3,510 sq. ft.
52 6630 sq. ft.
53 4,960 sq. ft.
54 4,320 sq. ft.
55 2,400 sq. ft.
56 2,400 sq. ft.
57 2,400 sq. ft.
58 2,400 sq. ft.
59 4,000 sq. ft.
60 8,255 sq. ft.
61 71,775 sq. ft.
1 38,462 sq. ft.
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 9-15-80
DATE OF REVISIONS
SCALE
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM - MAINLAND ZONE
LAWRENCE VERTICAL DATUM - MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
MAP NUMBER
145
167 146 126
166 125
165 144 124

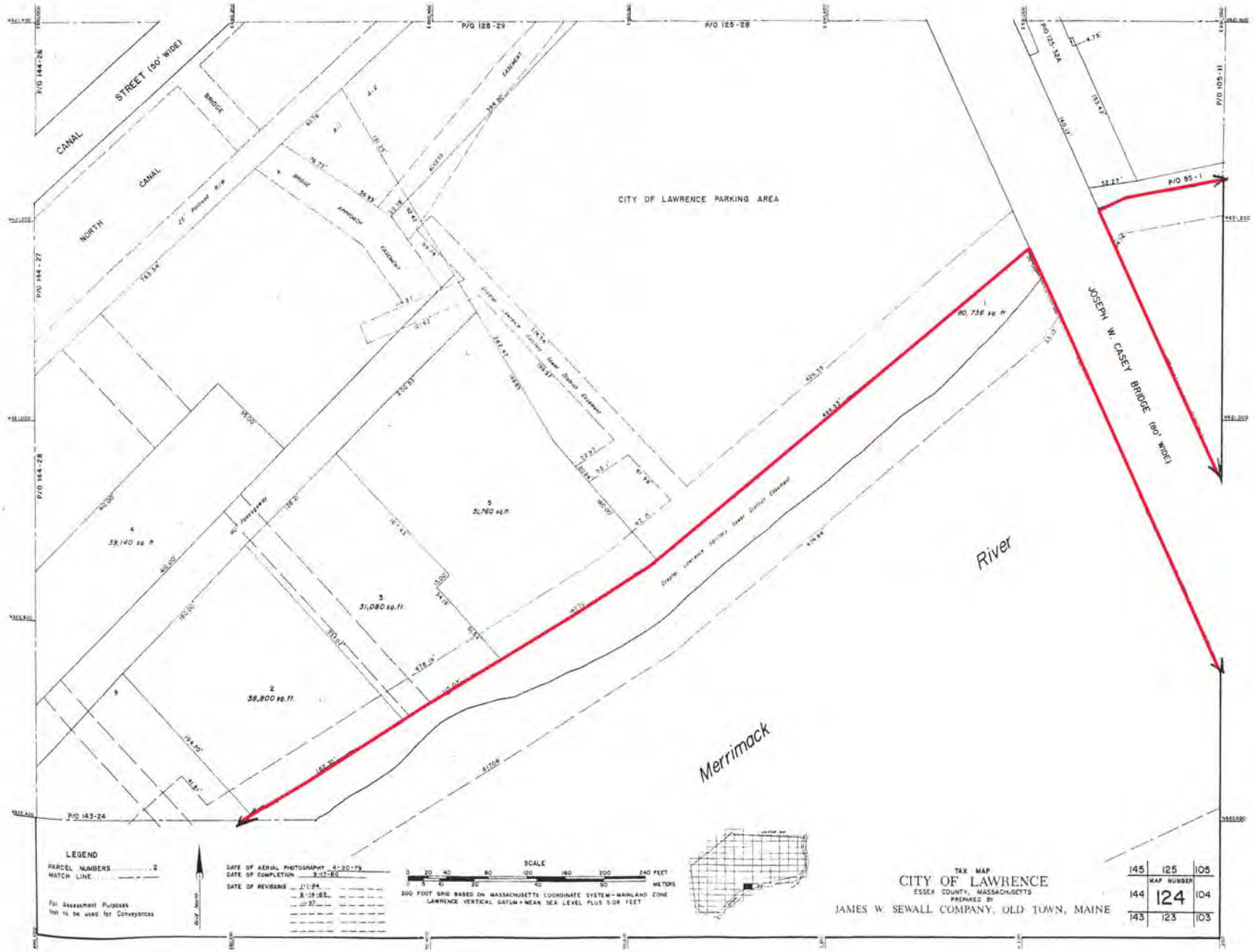

METHUEN STREET (50' WIDE)
P/O 126-9
P/O 126-46
P/O 126-45
P/O 126-44
P/O 126-39
AMESBURY
LAWRENCE STREET (60' WIDE)
STREET (80' WIDE)
ESSEX
STREET (50' WIDE)
STREET (50' WIDE)
HAMPSHIRE
METHUEN
STREET
CANAL
NORTH CANAL
JOSEPH W. CASEY BRIDGE (80' WIDE)
STREET (50' WIDE)
NORTH CANAL
CITY OF LAWRENCE PARKING AREA
P/O 144-26
P/O 144-27
P/O 85-7
P/O 105-11
COM. OF MASS. COURTHOUSE
1 71,100 sq. ft.
2 4,611 sq. ft.
3 2,066 sq. ft.
4 7,134 sq. ft.
5 1,002 sq. ft.
6 3,654 sq. ft.
7 3,698 sq. ft.
8 3,726 sq. ft.
9 4,000 sq. ft.
10 8,790 sq. ft.
11A 3,442 sq. ft.
11 4,087 sq. ft.
12 2,800 sq. ft.
13 1,788 sq. ft.
13-1 1,408 sq. ft.
13-2 1,624 sq. ft.
14 4,000 sq. ft.
15 1,672 sq. ft.
16 1,672 sq. ft.
17 3,200 sq. ft.
18 4,800 sq. ft.
19 11,700 sq. ft.
20 14,430 sq. ft.
21 16,770 sq. ft.
22 4,763 sq. ft.
23 8,165 sq. ft.
24 51,875 sq. ft.
25 8,925 sq. ft.
26 23,123 sq. ft.
27 4,763 sq. ft.
28 281,508 sq. ft.
29 55,035 sq. ft.
30 66,734 sq. ft.
31 1,540 sq. ft.
32 17,087 sq. ft.
32A 8,984 sq. ft.
LEGEND
PARCEL NUMBERS 2
MATCH LINE
For Assessment Purposes Only - Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 4-17-80
DATE OF REVISIONS 10-15-80
SCALE
0 20 40 80 120 160 200 240 FEET
0 20 40 60 80 METERS
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM - MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
146 126 106
MAP NUMBER
145 125 105
144 124 104

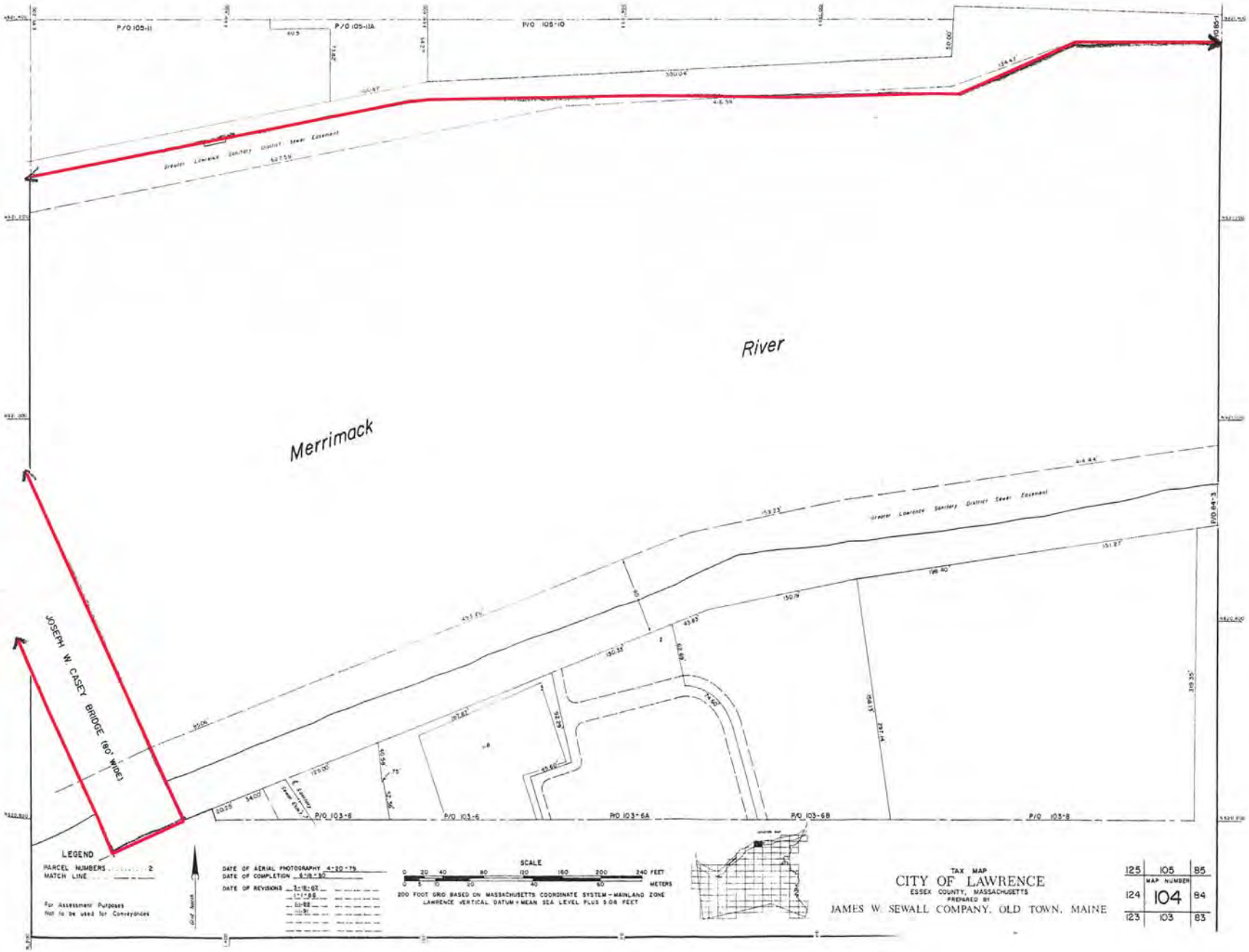

METHUEN STREET (50' WIDE)
APPLETON STREET (60' WIDE)
JACKSON STREET (60' WIDE)
MILL STREET (50' WIDE)
ESSEX COUNTY COURTHOUSE
P/O 125-30
1
44,197 sq. ft.
2
27,865 sq. ft.
3
16,500 sq. ft.
4
14,490 sq. ft.
5
12,028 sq. ft.
6
21,000 sq. ft.
7
21,000 sq. ft.
CANAL
STREET
CANAL
STREET (50' WIDE)
NORTH CANAL
BRIDGE
BRIDGE
BRIDGE
P/O 85-7
P/O 85-7
25' Revised R/W
9
93,520 sq. ft.
14,309
8
88,000 sq. ft.
11
304,406 sq. ft.
11-1
41,335 sq. ft.
10
239,151 sq. ft.
15' R/W
P/O 85-6
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes
Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 9-11-80
DATE OF REVISIONS 11-5-80
11-1-84
11-87
11-88
12-81
12-82
SCALE
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM - MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
126 106 86
125 105 85
124 104 84
MAP NUMBER

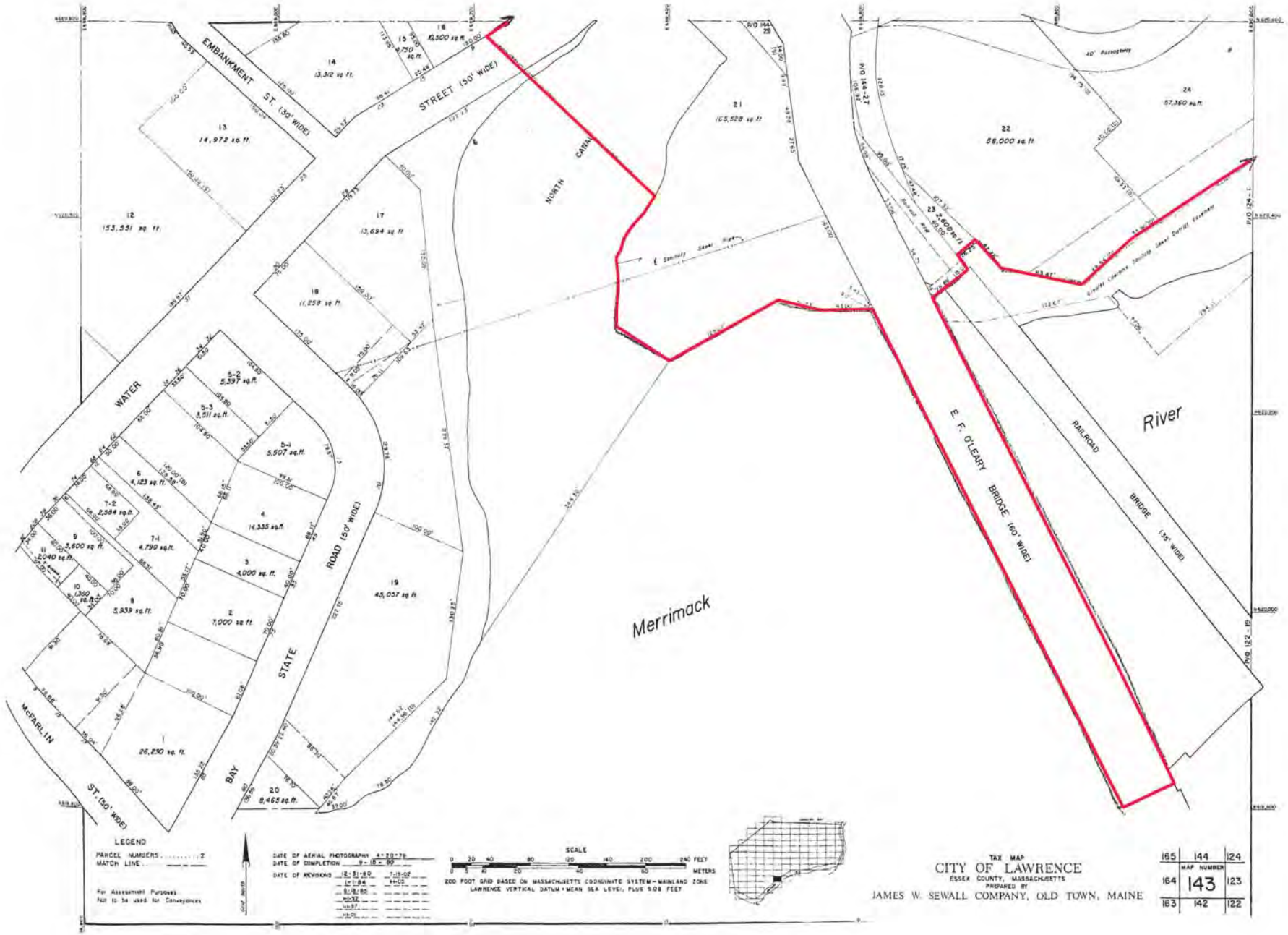

NEWBURY STREET (50' WIDE)
(DISCONTINUED)
8
36,803 sq. ft.
9
46,233 sq. ft.
12
4,290 sq. ft.
11
4,680 sq. ft.
10
5,027 sq. ft.
10' Wide Passageway
Passageway & Sewer Easement
CANAL
STREET (50' WIDE)
P/O 86-82
P/O 86-81
14
16,464 sq. ft.
13
28,769 sq. ft.
STREET (50' WIDE)
NORTH
CANAL
6
92,490 sq. ft.
5
57,000 sq. ft.
4
71,250 sq. ft.
3
25,650 sq. ft.
2
11,400 sq. ft.
1
55,460 sq. ft.
Greater Lawrence Sanitary Sewer District Easement
Sanitary Sewer Pipe
P/O 105-9
UNION
Merrimack
River
15
110,360 sq. ft.
NORTH
CANAL
20
39,960 sq. ft.
ISLAND
(PRIVATE)
STREET (50' WIDE)
16A
11,275 sq. ft.
16
62,761 sq. ft.
17
35,442 sq. ft.
P/O 66-2
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes
Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 8-7-80
DATE OF REVISIONS
SCALE
0 20 40 80 120 160 200 240 FEET
0 5 10 20 40 60 80 METERS
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM - MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 8.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
106 86 67
MAP NUMBER
105 85 66
104 84 65


P/O 86-61
P/O 85-15
P/O 67-1
STREET (50' WIDE)
CANAL
NORTH CANAL
DAM
Spicket River
ISLAND
(PRIVATE)
STREET (50' WIDE)
1
111,700 sq.ft.
2
58,748 sq.ft.
3
68,632 sq.ft.
4
83,685 sq.ft.
5
240,543 sq. ft.
6
12,690 sq. ft.
River
Merrimack
P/O 85-17
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes
Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPH 4-20-79
DATE OF COMPLETION 3-2-80
DATE OF REVISIONS
SCALE
0 20 40 80 120 160 200 240 FEET
0 5 40 20 40 60 METERS
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM-MAINLAND ZONE
LAWRENCE VERTICAL DATUM + MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W SEWALL COMPANY, OLD TOWN, MAINE
86 67 48
MAP NUMBER
85 66 47
84 65 46


STREET
(60' WIDE) ESSEX
METHUEN
STREET (50' WIDE)
FRANKLIN
STREET (50' WIDE)
BROADWAY (66' WIDE)
STREET (50' WIDE)
CANAL
NORTH CANAL
EMBANKMENT
ST. (30' WIDE)
STREET (50' WIDE)
WATER
P/O 145 - 1
P/O 125 - 1
P/O 165-40
P/O 124-4
P/O 143-12
P/O 143-14
P/O 143-15
P/O 143-16
P/O 143-21
P/O 143-22
17
14,000 Sq. ft
21
5,070 sq. ft
20
7,098 sq. ft
19
3,100 sq. ft
10
1350 sq. ft
9
5,311 sq. ft
13
16,722 sq. ft
8
32,298 sq. ft
15
51,685 sq. ft
16
9,623 sq. ft
14
6,975 sq. ft
22
84,048 sq. ft
23
1,690 sq. ft
25
50,430 sq. ft
26
92,384 sq. ft
24
25,570 sq. ft
5
6,378 sq. ft
4
9,200 sq. ft
3
2,900 sq. ft
2
16,216 sq. ft
1
34,461 Sq. ft.
27-2
1690 sq. ft.
27-1
219,480 sq. ft.
28
168,850 sq. ft.
29
3,784 sq. ft.
Mass. Bay Transit Authority
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes
Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 9-15-80
DATE OF REVISIONS
SCALE
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM - MAINLAND ZONE
LAWRENCE VERTICAL DATUM - MEAN SEA LEVEL PLUS 5.09 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
MAP NUMBER
166 145 125
165 144 124
164 143 123

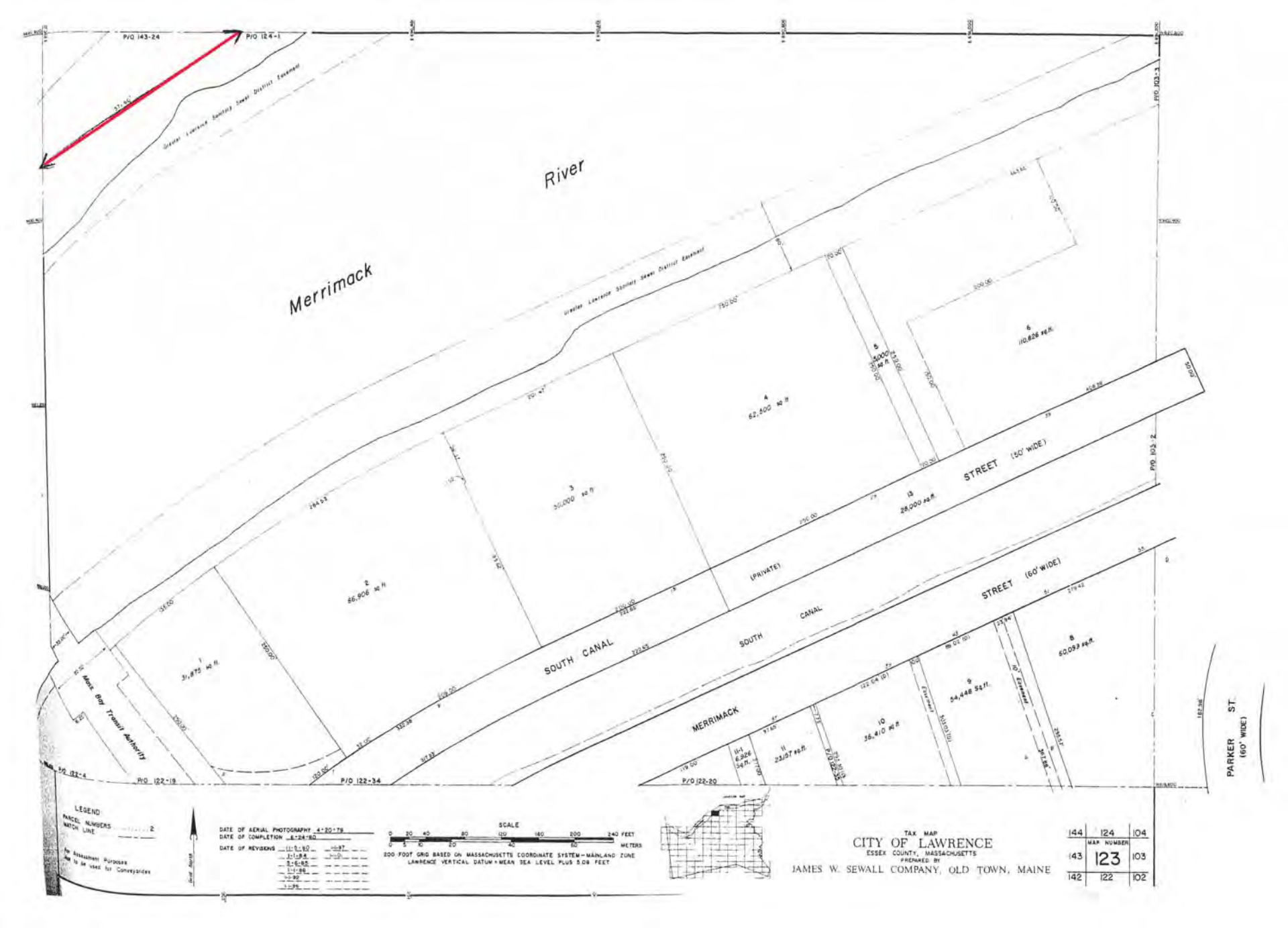

P/O 125-29
P/O 125-28
P/O 125-32A
P/O 105-11
P/O 85-1
P/O 144-26
P/O 144-27
P/O 144-28
P/O 143-24
STREET (50' WIDE)
CANAL
BRIDGE
NORTH
CANAL
21' Railroad R/W
CITY OF LAWRENCE PARKING AREA
JOSEPH W. CASEY BRIDGE (80' WIDE)
River
Merrimack
1
90,736 sq. ft
2
38,800 sq. ft.
3
31,080 sq. ft.
4
39,140 sq. ft
5
51,760 sq. ft
LEGEND
PARCEL NUMBERS 2
MATCH LINE .....
For Assessment Purposes
Not to be used for Conveyances
Grid North
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 9-17-80
DATE OF REVISIONS 7-1-84
8-15-88
-97-
SCALE
0 20 40 80 120 160 200 240 FEET
0 5 10 20 40 60 METERS
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM-MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
145 125 105
144 MAP NUMBER 124 104
143 123 103


P/O 105-11
P/O 105-11A
P/O 105-10
Greater Lawrence Sanitary District Sewer Easement
Merrimack
River
JOSEPH W. CASEY BRIDGE (80' WIDE)
P/O 64-3
P/O 103-6
P/O 103-6A
P/O 103-6B
P/O 105-8
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes
Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 6-18-80
DATE OF REVISIONS
SCALE
0 20 40 80 100 160 200 240 FEET
0 5 10 20 40 60 METERS
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM - MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
125 105 85
MAP NUMBER
124 104 84
123 103 83



TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE

165	144	124
164	MAP NUMBER 143	123
163	142	122


P/O 143-24
P/O 124-1
Greater Lawrence Sanitary Sewer District Easement
Merrimack River
P/O 103-3
P/O 103-2
STREET (50' WIDE)
(PRIVATE)
SOUTH CANAL
STREET (60' WIDE)
MERRIMACK
PARKER ST. (60' WIDE)
Mass Bay Transit Authority
P/O 122-4
P/O 122-19
P/O 122-34
P/O 122-20
1
31,875 sq ft
2
66,906 sq ft
3
50,000 sq ft
4
62,400 sq ft
5
6
110,826 sq ft
8
60,093 sq ft
9
54,448 sq ft
10
36,410 sq ft
11
23,057 sq ft
11-1
6,926 sq ft
13
28,000 sq ft
Easement
LEGEND
PARCEL NUMBERS
MATCH LINE
For Assessment Purposes Not to be used for Conveyances
DATE OF AERIAL PHOTOGRAPHY 4-20-79
DATE OF COMPLETION 6-24-80
DATE OF REVISIONS
SCALE
200 FOOT GRID BASED ON MASSACHUSETTS COORDINATE SYSTEM – MAINLAND ZONE
LAWRENCE VERTICAL DATUM = MEAN SEA LEVEL PLUS 5.08 FEET
TAX MAP
CITY OF LAWRENCE
ESSEX COUNTY, MASSACHUSETTS
PREPARED BY
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
144 124 104
143 123 103
142 122 102
MAP NUMBER

NORTH CANAL 1HD

1. 322400
   4730040

2. 323600
   4730540

3. 324200
   4730280

4. 322420
   4729860

42° 30"

North Canal Historic District, Lawrence (Essex Co.)

2009 Technical Amendment and Boundary Increase

1. East elevation of Gate Keeper's House (map 3)
   (Photographer: Sarah Hansen, 2008)

3. Pacific Cotton Mill, Atlantic Mill Co. Spinning Mill #3 (map 4-I, 8, 9), looking north
   (Photographer: Sarah Hansen, 2008)

2. Pacific Cotton Mill, south elevation (map 4-I)
(Photographer: Sarah Hansen, 2008)

4. Family Service Inc., north elevation (map 6)
(Photographer: Sarah Hansen, 2008)

5. 454 North Canal Street, north elevation (map 7)
(Photographer: Sarah Hansen, 2008)

6. Upper Pacific Cotton Yarn Mill #5 Storehouse, looking south (map 11, 12)
(Photographer: Sarah Hansen, 2008)

7. Upper Pacific Storehouse #7, south elevation (map 15)
(Photographer: Sarah Hansen, 2008)

8. Central Bridge Approach, looking southeast (map 18-I)
(Photographer: Sarah Hansen, 2008)

9. Lower Pacific Finishing and Packing Mill, Washington Mills Bridge, north elevation
(map 23, 76) (Photographer: Sarah Hansen, 2008)

10. Atlantic Cotton Mills Boarding House, Central (Casey) Bridge, south and east elevations (map 17, 18, 18-I) (Photographer: Sarah Hansen, 2008)

11. Fenton Judicial Center, Lower Pacific Bridge, Washington Mills Bridge, l ooking north (map 24, 24-I, 25, 76) (Photographer: Sarah Hansen, 2008)

North Canal Historic District, Lawrence (Essex Co.)

2009 Technical Amendment and Boundary Increase

12. American Woolen Company Dye House, Washington Mills Building #1, south elevation (map 26, 27) (Photographer: Sarah Hansen, 2008)

13. Washington Mills Building #1, north elevation (map 27) (Photographer: Sarah Hansen, 2008)

14. American Woolen Company Storehouse #10, Bay State Woolen Mills Boarding House, looking north (map 29, 30) (Photographer: Sarah Hansen, 2008)

15. Washington Mills Company Building #6 (River Mill), north elevation (map 32) (Photographer: Sarah Hansen, 2008)

16. Pemberton Company Office and Warehouse #3, Stable, south and east elevation (map 35, 37) (Photographer: Sarah Hansen, 2008)

17. Pemberton Manufacturing Company Mail Mill, Lawrence Duck Company Mill #3, Pemberton Mill Bridges, north and west elevation (map 42, 44, 77, 78) (Photographer: Sarah Hansen, 2008)

18. Everett Mills Company Weaving and Spinning Mill #5, south and west elevation (map 46) (Photographer: Sarah Hansen, 2008)

19. Everett Mill Storehouse #6, Essex Company Mill #1, south and west elevation (map 52, 48) (Photographer: Sarah Hansen, 2008)

20. George Kunhardt Woolen Mill #1, Woolen Shop and Boiler House, and Mill #9, looking west (map 55, 56, 58) (Photographer: Sarah Hansen, 2008)

21. Broadway Bridge (O'Leary Bridge), looking north (map 72) (Photographer: Sarah Hansen, 2008)

22. Pemberton Mill Bridge, Washington Mills Company Building #1, Pemberton Manufacturing Company Main Mill (map 32, 42, 77) (Photographer: Sarah Hansen, 2008)

23. Morehouse Bakery, southeast corner (Photographer: Sarah Hansen, 2008)

24. Morehouse Bakery, southwest corner (Photographer: Sarah Hansen, 2008)

(Left)

25. Morehouse Bakery, north elevation
(Photographer: Sarah Hansen, 2008)

(Below)

26. Morehouse Bakery, south elevation
(Photographer: Sarah Hansen, 2008)

27. Morehouse Bakery, east and north elevations
(Photographer: Sarah Hansen, 2008)

28. Morehouse Bakery, east elevation (Photographer: Sarah Hansen, 2008)

Massachusetts Cultural Resource Information System
Scanned Record Cover Page

Inventory No:	LAW.A
Historic Name:	North Canal Historic District
Common Name:	
City/Town:	Lawrence
Village/Neighborhood:	Lawrence;
Local No:	
Year Constructed:	
Use(s):	Commercial District; Industrial Complex or District;
Significance:	Architecture; Commerce; Engineering; Industry;
Designation(s):	Nat'l Register District (11/13/1984);
Building Materials:	
Demolished	No

The Massachusetts Historical Commission (MHC) has converted this paper record to digital format as part of ongoing projects to scan records of the Inventory of Historic Assets of the Commonwealth and National Register of Historic Places nominations for Massachusetts. Efforts are ongoing and not all inventory or National Register records related to this resource may be available in digital format at this time.

The MACRIS database and scanned files are highly dynamic; new information is added daily and both database records and related scanned files may be updated as new information is incorporated into MHC files. Users should note that there may be a considerable lag time between the receipt of new or updated records by MHC and the appearance of related information in MACRIS. Users should also note that not all source materials for the MACRIS database are made available as scanned images. Users may consult the records, files and maps available in MHC's public research area at its offices at the State Archives Building, 220 Morrissey Boulevard, Boston, open M-F, 9-5.

Users of this digital material acknowledge that they have read and understood the MACRIS Information and Disclaimer (http://mhc-macris.net/macrisdisclaimer.htm)

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

NORTH CANAL ACCEPTED Area 44 LAW.A
NR 7/29/75 AREA A

AREA SURVEY - FORM A
MASSACHUSETTS HISTORICAL COMMISSION
Office of the Secretary, State House, Boston

1. Town Lawrence, Massachusetts

2. Name of area or section Great Stone Dam, North Canal, and South Canal.

3. General Date or period: Dam & N. Canal: 1845-48. S. Canal: ca. 1870.

4. Is the area uniform? Yes Uneven

In style Yes - granite block construction

In condition Yes - good, over-all

In type of ownership Yes - Essex Company

In use (Explain) Yes - flood control, water distribution.

5. Is area potentially threatened?

By Zoning

By Roads:

By Developers In places

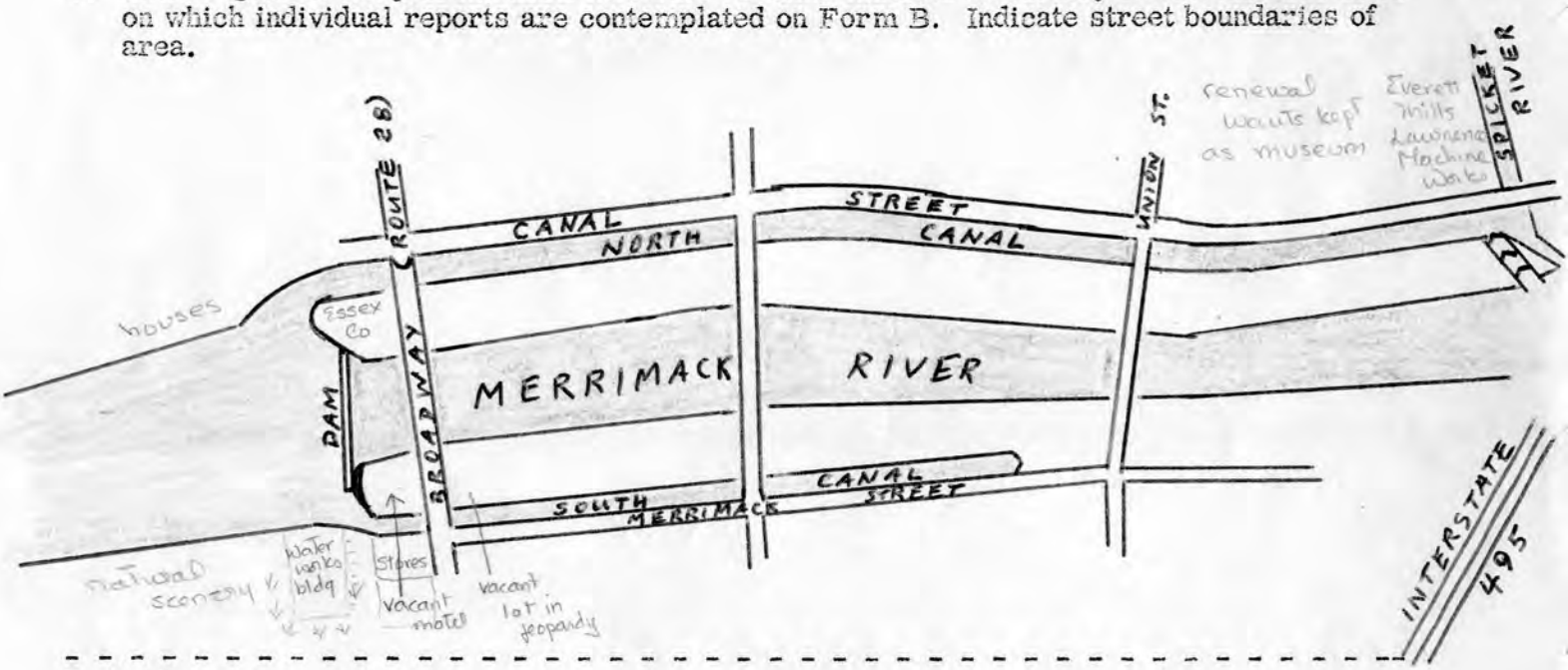
By Deterioration Yes: (water control machinery, remains of locks, etc.)

6. Please comment on the Historical or Architectural importance of this area

The Great Stone Dam, North Canal, and South Canal are important historically because of their connection with the history of the Merrimack Valley, Lawrence, and the textile industry; they are architecturally important as examples of water works of the mid-19th century, built to provide mill power and navigational facilities.

The falls in the Merrimack River above Lawrence were recognized early in the second quarter of the 19th century as a potential source of power. The dam and canals were built to harness this power for use in textile mills, some of which were built at the same time as the water-control works. The reason for the founding of what is now the city of Lawrence was the power of the river, made available for industrial use by the dam and canals.

7. Draw a general map of the area involved. Please indicate in red any known historic sites on which individual reports are contemplated on Form B. Indicate street boundaries of area.



Recorder James C. Hippen

For Merrimack Valley Textile Museum
(Name of Organization

Rt 28		

NOTE: Recorder should obtain written permission from Commission or sponsoring organization before using this form

LAW.A AREA A NR I

AREA SURVEY - FORM A
MASSACHUSETTS HISTORICAL COMMISSION
Office of the Secretary, State House, Boston

1. Town Lawrence.

2. Name of area or section Great Stone Dam, North Canal and South Canal

3. General Date or period Dam + N. Canal: 1845-8 Rest. S. Canal c. 1870

4. Is the area uniform Yes Uneven

In style Yes - granite block construction

Condition Yes - good, over-all

Type of ownership Yes - Essex Company

Use (explain) Flood control, water distribution.

5. Is area potentially threatened Yes.

By Zoning No.

By Roads No.

By Developers In places (not seriously)

By Deterioration Yes, (water control machinery remains of locks, etc.)

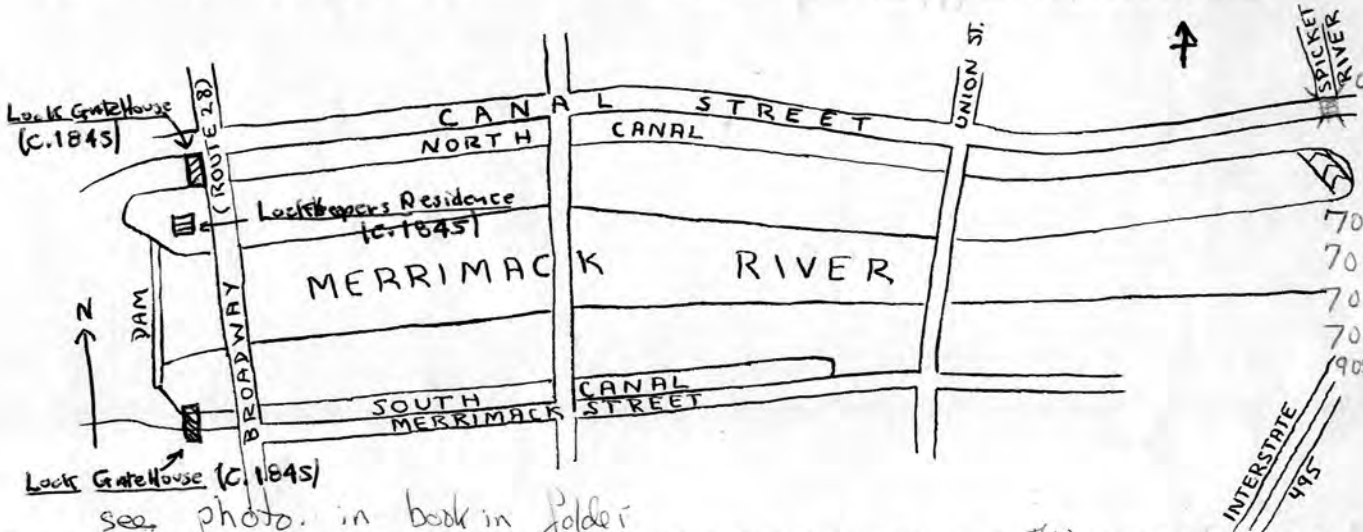
6. Please comment on the Historical or Architectural importance of this area

The Great Stone Dam, North Canal, and South Canal are important historically because of their connection with the history of the Merrimack Valley, Lawrence, and the textile industry; they are architecturally important as examples of water works of the mid-19th century, built to provide mill power and navigational facilities.

The falls in the Merrimack River above Lawrence were recognized early in the second quarter of the 19th century as a potential source of power. The dam and canals were built to harness this power for use in textile mills, some of which were built at the same time as the water-control works. The reason for the founding of what is now the city of Lawrence was the power of the river, made available for industrial use by the dam and canals.

(See also Attached National Register Statements)

7. Draw a general map of the area involved. Indicate in red any known historic sites on which individual reports are contemplated on Form B. Indicate street boundaries of area.



see photo. in book in folder

Recorder James P. Hippen (aw) & B.F. Talles, Jr. (12/2/70)

For Merrimack Valley Textile Museum
(Name of Organization)

68.2183 - 68.2186

NOTE: Recorder should obtain written permission from Commission or sponsoring organization before using this form.

MAR 3 1967

LAW.A

Bibliography:

1. Tracy, Cyrus M., et al. Standard History of Essex County, Massachusetts. Boston: C.F. Jewett & Company, 1878. (pp. 213-15, 221-26)

2. Fuess, Claude M., ed. The Story of Essex County. 4 vols. New York: The American Historical Society, Inc., 1935. (I, pp. 412-24; 428-31)

3. Hurd, D. Hamilton, ed. History of Essex County, Massachusetts. 2 vols. Philadelphia: J.W. Lewis & Co., 1888. (I, pp. 869-70)

4. Arrington, Benjamin F., ed. Municipal History of Essex County in Massachusetts. 2 vols. New York: Lewis Historical Publishing Company, 1922. (II, pp. 507-508; 510-11)

5. Stone, Orra L. History of Massachusetts Industries. 4 vols. Boston and Chicago: The S.J. Clarke Publishing Company, 1930.

6. Smith, Frederick M. The Essex Company on the Merrimack at Lawrence. New York: The Newcomen Society, 1947. (pp. 10-12)

7. Wadsworth, Horace A. History of Lawrence, Massachusetts. Lawrence: Lawrence Steam Eagle Printing Office, 1880. (pp. 39-55.)

8. Dorgan, Maurice B. Lawrence Yesterday and Today (1845-1918). Lawrence, Massachusetts: Press of Dick & Trumpold, 1918. (pp. 21-28)

9. Lawrence Board of Trade. Brief History of the City of Lawrence, Its Textile Industries, etc. Lawrence, Massachusetts: Lawrence Board of Trade, 1902. (pp. 69-71)

10. The Lawrence Gazetteer, Lawrence, Massachusetts: Charles G. Merrill, 1894. (p. 15.)

11. Lawrence Up to Date, 1845-1895. Lawrence, Massachusetts: Rush for the Donoghue, 1895. (pp. 11-20, 33)

12. Hayes, Jonathan F.C. History of the City of Lawrence. Lawrence, Massachusetts: E.D. Green, 1868. (pp. 3-27)

inventory #s in pencil

#1,5,36,650-52 LAW.A AREA: A

FORM A - AREA AND SITE SURVEY
MASSACHUSETTS HISTORICAL COMMISSION
Office of the Secretary, State House, Boston

1. Town Lawrence (Essex County)

2. Name of area or section Essex (Everett) - Pemberton Mills District

3. General Date or Period *Ref. 1845-1910's)

4. Is the area uniform? No.

In style No.

In condition Yes. (Good)

In type of ownership No. (Private commercial; industrial; residential)

In use (Explain) No. (Commercial; industrial-business; residential)

5. Is area potentially threatened? Possibly.

By Zoning Unknown.

By Roads No.

By Developers Not evidently.

By Deterioration To a degree.

6. Please comment on the Historical or Architectural importance of this area:

Inv. # ↓

(See attached National Register Statements)

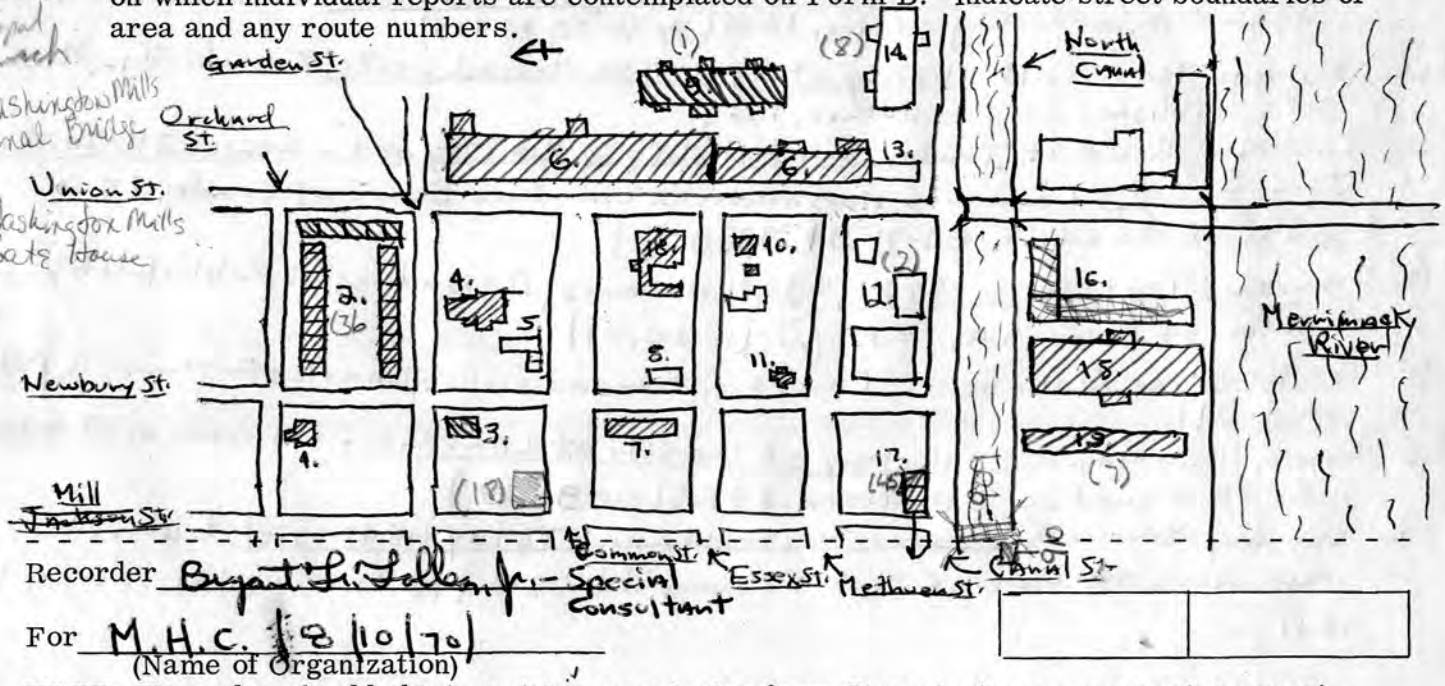
1. Newbury Street School (1850)
NR(36) 2. "Mechanics Blocks" (c.1847)
3. Lithuanian Catholic Church (Secondov Garden Street Church) (c.1857)
4. Atlantic Fire Engine House (Engine No. 2) (1871)
5. Stove Building (c.1896)
(#36) - 6. Everett Mills (1909)
7. Stove Block (c.1868)
8. Stove (c.1873)
NR(1) 9. Everett Mill (Essex Company Machine Shop and Foundry) (c.1853)
10. Essex Company buildings (1883)
11. Walton School (1862)
(5) 12. Pemberton Mills Office and Warehouse (c.1900)
13. Warehouse, Pemberton Mills (c.1875)
(651) 14. Everett Mills (c.1896)
15. Pemberton Mills (1861)
16. Lawrence Duck Company (c.1896)
(652) 17. Bay State (Washington) Mills Housing Unit (c.1846)
18. Holy Rosary Catholic Church (c.1873, etc.)
(650) 19. Bay State (Washington) Mills Factory Remnant (c.1846)

7. Draw a general map of the area involved. Please indicate in red any known historic sites on which individual reports are contemplated on Form B. Indicate street boundaries of area and any route numbers.

(18) Slavic Episcopal Church

909 - Washington Mills Canal Bridge

910 - Washington Mills Gate House



Recorder Bryant F. Tolles, Jr. - Special Consultant

For M.H.C. (8/10/70)
(Name of Organization)

NOTE: Recorder should obtain written permission from Commission or sponsoring organization before using this form.

Survey Considerations: A:1; A:3; A:4; A:5; A:6; A:7; A:9

FORM - MHCA - 10M-6-66-943017

Bibliography:

1. Tracy, Cyrus M., et Al. Standard History of Essex County, Massachusetts. Boston: C. F. Jewett & Company, 1878. (pp. 213-215)

2. Fuess, Claude M., ed. The Story of Essex County. 4 vols. New York: The American Historical Society, Inc., 1935 (I, pp. 412-424, 428-31, 221-226)

3. Hurd, D. Hamilton, ed. History of Essex County, Massachusetts. 2 vols. Philadelphia: J. W. Lewis & Co., 1888. (II, 1717, 889-900)

4. Arrington, Benjamin F., ed. Municipal History of Essex County in Massachusetts. 4 vols. New York: Lewis Historical Publishing Company, 1922. (II, pp 507-508; 510-11; 525)

5. Cole, Donald B. Immigrant City: Lawrence, Massachusetts, 1845-1921. Chapel Hill, North Carolina: University of North Carolina Press, 1963.

6. Vogel, Robert M., ed. The New England Textile Mill Survey I - June - September, 1967. Washington, D.C.: The Smithsonian Institution, 1968. (pp. 26-28)

7. North Andover, Massachusetts. Merrimack Valley Textile Museum. Barlow and Bancroft insurance survey (Washington Mills) (c. 1875)

8. Stone, Orra L. History of Massachusetts Industries. 4 vols. Boston and Chicago: The S. J. Clarke Publishing Company, 1930. (II, pp. 325-44)

9. McKay, Gordon. The Lawrence Machine Shop. Boston: The Lawrence Machine Shop, 1854. (pp. 1-16).

10. Smith, Frederick Morton. The Essex Company on the Merrimack at Lawrence. New York: The Newcomen Society, 1947. (pp. 1-32)

11. Wadsworth, Horace A. History of Lawrence, Massachusetts. Lawrence: Lawrence Steam Eagle Printing office, 1888. (pp. 39-55; 86-105)

12. Dorgan, Maurice B. History of Lawrence, Massachusetts. Cambridge, Massachusetts: Published by the Author, 1924.

13. Lawrence Board of Trade, Brief History of the City of Lawrence, Its Textile Industries, etc. Lawrence, Massachusetts: Lawrence Board of Trade, 1902. (pp. 27, 37, 55, 64, 65, 69-71, 91, 93, 97,)

14. Lawrence Up to Date, 1845-1895. Lawrence, Massachusetts: Published by Rushforth & Donoghue, 1895. (pp. 11-20, 33)

15. The Lawrence Gazetteer. Lawrence, Massachusetts: Charles G. Morrill, 1894. (pp. 15-21)

16. Hayer, Jonathan F. C., History of the City of Lawrence. Lawrence, Massachusetts: Published by E. D. Green, 1868. (pp. 5-27)

17. Dorgan, Maurice B. Lawrence Yesterday and Today (1845-1918). Lawrence, Massachusetts: Press of Dick & Trumpold, 1918. (pp 21-28; 31-32; 97-98; 153; 161)

LAW.A

The Pemberton Mill

"The Pemberton Mill of 1861 is equally spectactular as a mill building. It has not only a distinct architectural character with strong overtones of French Renaissance about the central towers (which are probably unique among textile mills housing elevator shafts rather than the stairs, which are in two corners of the building), but an unusual massiveness in all of its structural components This was in apparent reaction to design inadequacies and physical defects in the first Pemberton Mill, built in 1856, which on the afternoon of January 10, 1860, completely collapsed with all hands aboard, an event of which the memory is still not completely dead in Lawrence. The new mill arose virtually from the ashes of the old (ensuing fire finished off much of the wreckage and many of the trapped victims), upon the same foundations. Most notable of the general evidences of overstrength in the building are the incredibly heavy split granite blocks which form the two side lines of columns and all of the longitudinal beams in the basement story, the building being four bays wide.* "

"Footnote: The central columns are brick, pierced along the line of the mill's longitudinal axis by portholes near their bottoms for passage of the main drive shaft. "

Taken from: The New England Textile Mill Survey by the Smithsonian Institution, the National Park Service and the Merrimack Valley Textile Museum, Feb., 1968. Photo included, also elevation & detail drawings.

~~See also~~

Massachusetts Cultural Resource Information System
Scanned Record Cover Page

Inventory No:	LAW.906
Historic Name:	North Canal
Common Name:	
Address:	North Canal St
City/Town:	Lawrence
Village/Neighborhood:	Lawrence;
Local No:	
Year Constructed:	R 1848
Architect(s):	Storrow, Charles;
Use(s):	Other Industrial;
Significance:	Industry;
Area(s):	LAW.A, LAW.W
Designation(s):	Nat'l Register Individual Property (07/29/1975); Nat'l Register District (11/13/1984); Nat'l Register District (05/08/2009);
Building Materials:	
Demolished	No

The Massachusetts Historical Commission (MHC) has converted this paper record to digital format as part of ongoing projects to scan records of the Inventory of Historic Assets of the Commonwealth and National Register of Historic Places nominations for Massachusetts. Efforts are ongoing and not all inventory or National Register records related to this resource may be available in digital format at this time.

The MACRIS database and scanned files are highly dynamic; new information is added daily and both database records and related scanned files may be updated as new information is incorporated into MHC files. Users should note that there may be a considerable lag time between the receipt of new or updated records by MHC and the appearance of related information in MACRIS. Users should also note that not all source materials for the MACRIS database are made available as scanned images. Users may consult the records, files and maps available in MHC's public research area at its offices at the State Archives Building, 220 Morrissey Boulevard, Boston, open M-F, 9-5.

Users of this digital material acknowledge that they have read and understood the MACRIS Information and Disclaimer (http://mhc-macris.net/macrisdisclaimer.htm)

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

LAW.906

EXISTING SURVEYS | DATA | DWGS | PHOTOGRAPHS | STATES

CARD ONE

HAER INVENTORY

1. NAME OF STRUCTURE: North Canal

2. DATE: 1848

3. NATURE OF STRUCTURE: Power Canal

4. INDUSTRIAL CLASSIFICATION: 812

5. LOCATION: STREET & NUMBER: parallel to Canal Street — CITY OR TOWN: Lawrence — COUNTY: Essex — STATE: MA

6. USGS QUAD MAP & UTM GRID REF.: Lawrence 19.322520. 472992

7. OWNER OF PROPERTY / ADDRESS: Essex Company, 6 Essex Street, Lawrence, MA 01845

8. CONDITION: [X] EXCELLENT [ ] GOOD [ ] FAIR [ ] DETERIORATED [ ] RUINS [ ] UNEXPOSED [ ] ALTERED [X] ACCESSIBLE TO PUBLIC

9. DESCRIPTION & BACKGROUND HISTORY: NUMBER OF STRUCTURES; DIMENSIONS; FABRIC; STRUCTURE & FORM; SURVIVING MACHINERY, FITTINGS AND EQUIPMENT; APPROX. AREA OF SITE; ALTERATIONS; PRESENT USE; ENGINEER/ ARCHITECT/DESIGNER; IMPORTANT EVENTS & INDIVIDUALS.

The North Canal, like the Great Stone Dam, was designed by Charles Storrow, Chief Engineer and Treasurer of the Essex Company. Storrow's successor as Chief Engineer, Charles Bigelow, constructed the canal. Another supervising engineer was Joseph Bennett, translator of J. F. d'Aubisson's Treatise on Hydraulics. The canal was designed to conform with the latest ideas of the French hydraulicians in the design of its sections, its slope, and its almost straight course. The canal is 5,330 feet in length, 100 feet wide at the gatehouse, and 60 feet wide at the Spicket ~~water~~ WASTE way. Water from the Lawrence millpond flows into the canal and exits into the Spicket River. The average fall is 30 feet. The canal is 12 feet deep at its head and almost 13 feet deep at the wasteway, since the canal bottom is graded to fall 1/2 foot in 5,000 feet. The section of the canal is trapezoidal, with retaining walls of random coursed granite blocks throughout its length. The bottom is sealed with clay puddle to prevent leakage. The canal was completed in 1848, construction having begun in 1845. The gatehouse was completed in 1848, and contains 24 gates, which until 1960 were manually operated on the rack and pinion principal. The present wasteway also dates from 1848. A wooden flume was constructed during the 1880s in order to encourage smoother (see Card Two)

10. PHOTOGRAPHS & SKETCH MAP ON REVERSE SIDE.

11. RELATED SOURCES OF INFORMATION: HISTORICAL REFERENCES (PUBLISHED ARTICLES, MANUSCRIPTS, REPORTS, DRAWINGS, PHOTO GRAPHIC RECORDS) CONTACTS: (NAMES & ADDRESSES OF ANYONE WITH EYE-WITNESS ACCOUNTS OR RELEVANT INFORMATION); TAPE RECORDINGS.

U. S. Census for 1880, vol. XVI, Part I.
MSS. Essex Co., Merrimack Valley Textile Museum Library, North Andover, MA 01845
MSS. Essex Co., 6 Essex St., Lawrence, MA 01840

12. DANGER OF DEMOLITION OR DAMAGE [ ] YES [X] NO
NATURE OF THREAT:

13. PRIORITY: I

14. EXISTING SURVEYS AND DATES: [ ] NHL [X] NR [ ] HAER [ ] HABS [X] STATE [ ] COUNTY [ ] LOCAL [ ] OTHER

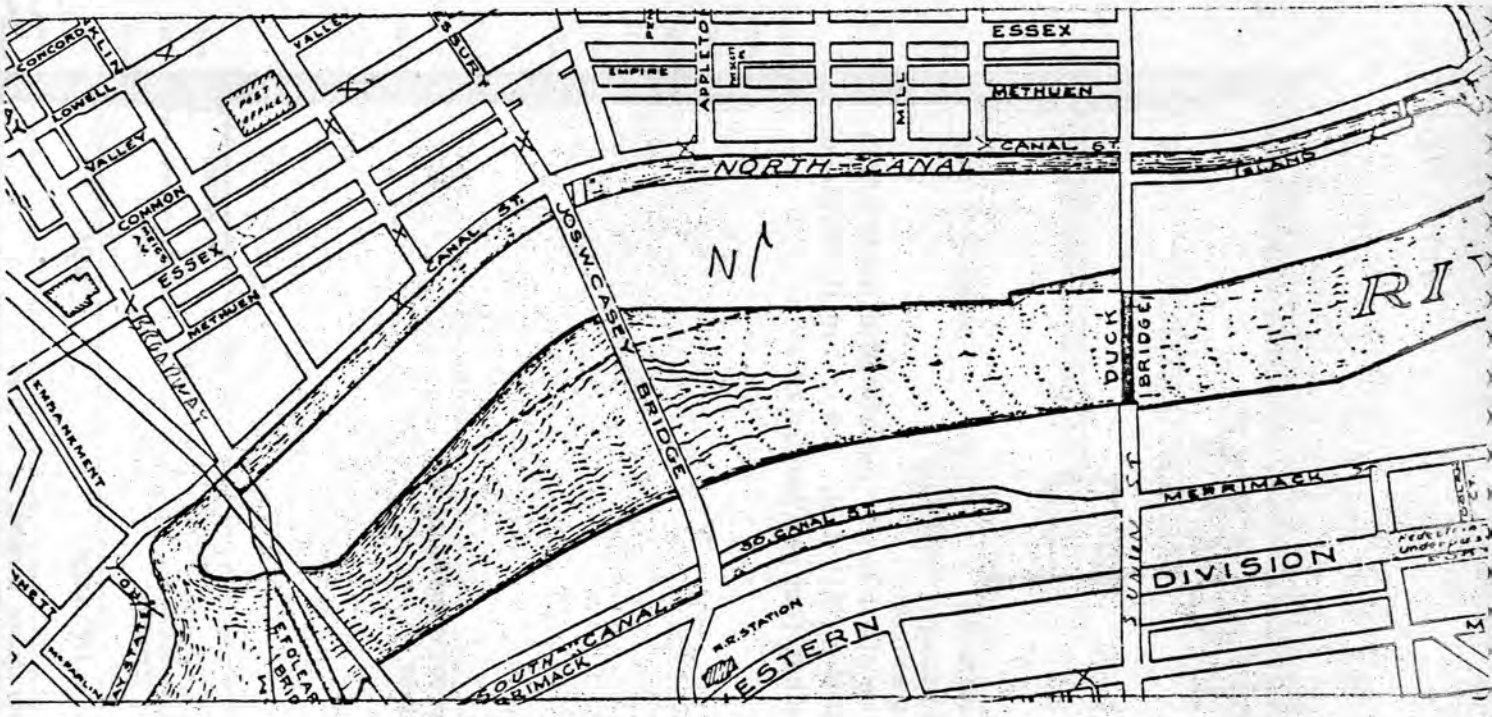
15. INVENTORIED BY: YOUR NAME: Peter M. Molloy — ADDRESS: 800 Mass. Ave., N. Andover, MA 01845 — AFFILIATION: Merrimack Valley Textile Museum — DATE: 11/1/75

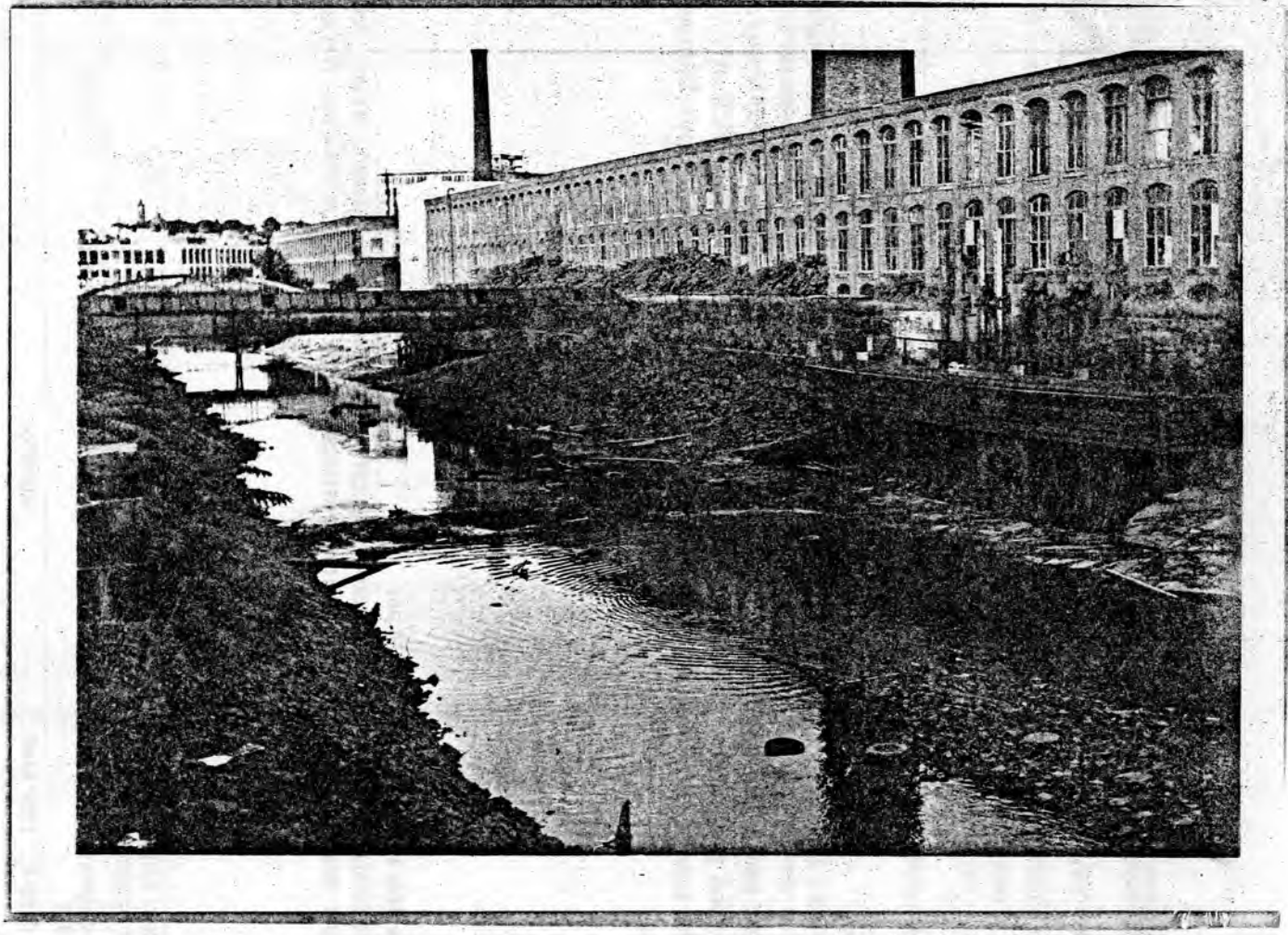
PLEASE RETURN TO THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, WASHINGTON, DC 20240

MANUFACTURING INDUSTRIES (MFG) | UTILITIES (UTIL) | POWER SOURCES & PRIME MOVERS (PS & PM) | TRANSPORTATION (TRANS) | COMM | BRIDGES

P30618X

LAW. 906


CONCORD
LOWELL
VALLEY
COMMON
POST OFFICE
ESSEX
METHUEN
EMPIRE
APPLETON
MILL
CANAL ST.
NORTH CANAL
CANAL ST.
JOS. W. CASEY BRIDGE
DUCK ISLANDS
BRIDGE
EMBANKMENT
MERRIMACK ST.
DIVISION
R.R. STATION
SOUTH CANAL
MERRIMACK
EASTERN



LAW.906

EXISTING SURVEYS: NR | HAER | HABS | STATE | COUNTY | LOCAL | OTHER
DOD
DATA: FN | HIST | TECH | ARCH | TAPES
DWGS: HAER | OTHER
PHOTOGRAPHS: FIELD | SLIDES | HIST | SURVEY | STEREO | MOVIES
LC
STATES: AL AK AZ AR CA CO CT DE DC FL GA HI ID IL IN IA KS KY LA ME MD MA MI MN MS MO MT NE NV NH NJ NM NY NC ND OH OK OR PA RI SC SD TN TX UT VT VA WA WV WI WY

DATES OF CONSTRUCTION: NHL | PRE 19th C | 1800 1809 | 1810 1819 | 1820 1829 | 1830 1839 | 1840 1849 | 1850 1859 | 1860 1869 | 1870 1879 | 80 -89 | 1890 1899 | 1900 1909 | 1910 1919 | 1920 1929 | 1930 PRESENT

CARD TWO HAER INVENTORY

1. NAME OF STRUCTURE: North Canal
2. DATE
3. NATURE OF STRUCTURE
4. INDUSTRIAL CLASSIFICATION
5. LOCATION: STREET & NUMBER — CITY OR TOWN — COUNTY — STATE
6. USGS QUAD MAP & UTM GRID REF.
7. OWNER OF PROPERTY — ADDRESS
8. CONDITION: ☐ EXCELLENT ☐ GOOD ☐ FAIR ☐ DETERIORATED ☐ RUINS ☐ UNEXPOSED ☐ ALTERED ☐ ACCESSIBLE TO PUBLIC
9. DESCRIPTION & BACKGROUND HISTORY: NUMBER OF STRUCTURES; DIMENSIONS; FABRIC; STRUCTURE & FORM; SURVIVING MACHINERY, FITTINGS AND EQUIPMENT; APPROX. AREA OF SITE; ALTERATIONS; PRESENT USE; ENGINEER/ ARCHITECT/DESIGNER; IMPORTANT EVENTS & INDIVIDUALS.

flow for about 100 yards before the canal flows over the Spicket wasteway. The other major modification occurred in 1961, when the single lock at the head of the canal and the triple lock at its foot were filled in. Several mills continue to make use of the canal's water, which delivers an average of four thousand cubic feet per second of water.

10. PHOTOGRAPHS & SKETCH MAP ON REVERSE SIDE.
11. RELATED SOURCES OF INFORMATION: HISTORICAL REFERENCES (PUBLISHED ARTICLES, MANUSCRIPTS, REPORTS, DRAWINGS, PHOTO GRAPHIC RECORDS) CONTACTS: (NAMES & ADDRESSES OF ANYONE WITH EYE-WITNESS ACCOUNTS OR RELEVANT INFORMATION); TAPE RECORDINGS.
12. DANGER OF DEMOLITION OR DAMAGE ☐ YES ☐ NO — NATURE OF THREAT:
13. PRIORITY
14. EXISTING SURVEYS AND DATES: ☐ NHL ☐ NR ☐ HAER ☐ HABS ☐ STATE ☐ COUNTY ☐ LOCAL ☐ OTHER
15. INVENTORIED BY: YOUR NAME — ADDRESS — AFFILIATION — DATE

PLEASE RETURN TO THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, WASHINGTON, DC 20240

EXTRACTIVE INDUSTRIES (EXTRAC): 01 IRON | 02 COAL | 03 OIL | 04 MINRL | 05 NON-FERROUS | 06 | 07 | 08 | 09

BULK PRODUCT INDUSTRIES (BULK): 10 AGRI | 11 BPGC | 12 CHEM | 13 FOOD | 14 METAL | 15 TEXT | 16 WOOD | 17 | 18 | 19 | 20

SUB-CLASSIFICATION: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

SPECIALIZED STRUCTURES (SPEC STRUC): 93 | 92 | 91 | SURVEY 90 | MUSEUM 89 | ADAPT 88 | HOUS 87 | P&ET 86 | MATS 85 | MATH 84 | HEAT 83 | CONST 82 | HYDRA 81 | TUNLS 80 | DAM 79

BUILDING TECHNOLOGY (BLD TECH): 78 | 77 | 76 | ANCIL 75 | MECH 74 | FENES 73 | ROOF 72 | FLOOR 71 | FRAME 70 | FOUND 69

MANUFACTURING INDUSTRIES (MFG): MACH | FABR | TEQUIP | INST | GM/FG
UTILITIES (UTIL): WATER | SANI | GAS | ELEC
POWER SOURCES & PRIME MOVERS (PS & PM): MUSL | WATER WHEEL | WATER TURB | WIND | STEAM RECIP | STEAM TURB | INT COMB | DIESEL | ELEC
TRANSPORTATION (TRANS): RR | ROAD | CANAL | MARINE | AIR | PIPE
COMM: T&T | R&TV
BRIDGES: BEAM | ARCH | TRUSS | SUSP | AQUE | TRES | CANT | MOVE

P30618X

HAER 17

NPS Form 10-900
(3-82)

OMB No. 1024-0018
Exp. 10-31-84

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only

received

date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic North Canal Historic District

and/or common North Canal Historic District

2. Location

street & number See attached owner/property list N/A not for publication

city, town Lawrence N/A vicinity of

state Massachusetts code 025 county Essex code 009

3. Classification

Category	Ownership	Status	Present Use	
X district	X public	X occupied	___ agriculture	X museum
___ building(s)	X private	___ unoccupied	X commercial	X park
___ structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	X yes: restricted	___ government	___ scientific
	N/A being considered	___ yes: unrestricted	X industrial	___ transportation
		___ no	___ military	___ other:

4. Owner of Property

name See attached owner/property list

street & number

city, town ___ vicinity of state

5. Location of Legal Description

courthouse, registry of deeds, etc. North Essex Registry of Deeds

street & number 381 Common Street

city, town Lawrence state Massachusetts

6. Representation in Existing Surveys

title Historic American Engineering Record/ Inventory of the Historic Assets of the Commonwealth has this property been determined eligible? ___ yes X no

date 1976, 1978 X federal X state ___ county ___ local

depository for survey records Merrimack Valley Textile Museum; Massachusetts Historical Commission

city, town North Andover a Boston state Massachusetts

7. Description

North Canal Historic District Lawrence, MA

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	X original site
X good	___ ruins	X altered	___ moved date _____
X fair	___ unexposed		

Describe the present and original (if known) physical appearance

The North Canal Historic District is a 60-acre, mile-long complex of nineteenth and early twentieth century hydraulic structures bridges, textile mills, and related buildings on the north and south banks of the North Canal of the Merrimack River. Part of the development which began as a planned industrial venture of the Essex Company in 1845, the buildings are situated on dredged and partially filled land. The District contains approximately 100 buildings, most of which are used commercially or industrially; two ca. 1848 gatekeeper's houses and a boarding house are still used residentially. The district has only nine intrusions.

The Merrimack River enters Lawrence at the City's western edge and drains the city, flowing east to the convergence with the Spicket and Shawsheen Rivers. The North Canal is located along and parallel to the Merrimack as it runs through Lawrence. As part of the original town plan of 1844, which provided for industrial development, the Canal is the focus of the central city's major streets. The district is two blocks south of the main commercial area along Essex Street; Broadway is the western terminus; Union Street intersects at the center; Marston Street and the Spicket River are near the eastern edge. Canal and Island Streets run along portions of the Canal, and the district is bisected by numerous railroad tracks and spurs. Canal Street was both a residential street and an industrial route; double rows of elms once lined the street which was shared by boardinghouses and mills.

The earliest buildings of significance date from the founding of Lawrence in the 1840s; the latest date from the last phase of mill construction in the period 1910-1925. The district represents a chronology of the development of industrial architectural styles and technological advances. The earliest industrial buildings are pitched-gable-roofed structures of thick coursed granite rubble; the latest are of fireproof, reinforced concrete construction with acres of floorspace which could accommodate huge looms under their flat roofs. Most buildings in the district are relatively unaltered and in fair to good condition; rear additions or enclosures of corrugated metal or frame construction are common. The Russell-Champion International Paper Mill site at the eastern end of the district is in ruins.

The industrial activities of the district included cotton and woolen manufacture, paper manufacture, machinery and metal fabrication, and mill-related industries such as bobbin and shuttle manufacture. The first power source, the Great Stone Dam ca. 1848, is intact; penstocks and raceways along the Canal are still in use. Some nineteenth century machinery is also intact. Although the mill company sites have been rebuilt continually, the district still contains examples of every period of development and technological advance; later intrusions have not destroyed the relationships of the mill complexes to the Canal. Impressive changes in scale, from boarding house, to machine shop, to 300-foot-long mills are still highly visible and not obscured by infill building. Most important are the views of the canal and its buildings from the Broadway and Union Street Bridges.Among technological advances evident in mill design, are the change from water to steam power, the

introduction of wide looms, changes made in accordance with the requirements of fire-insurance companies, the installation of ventilation and humidification systems, and the introduction of electricity and reinforced concrete. Human environments changed as well as later mills evidenced greater sensitivity to the health and safety of workers.

The following description is organized geographically from west to east. Because of the razing and rebuilding of mill company sites, no orderly chronology is possible and early structures (1848-1853) are found across the entire length of the district. Buildings or structures representative of type, period, and use are described here; buildings or structures previously listed on the National Register of Historic Places are indicated. Intrusions and vacant lots are listed on the District Data Sheet.

"THE UPPER ISLAND": BROADWAY TO AMESBURY STREET

The Upper Island, between the Broadway and Central Bridges, is the site of the Great Stone Dam and related structures and portions of two large mill complexes. The extant buildings were constructed between 1845 and 1910 on the site of the city's earliest mills. A large portion of the island at the eastern edge, the Atlantic Mill site, is devoted to parking for the City of Lawrence. Along the southern edge of the canal, the Atlantic and Upper pacific Mills from a continuous brick facade. The view terminates in small-scale frame structures clustered near the dam. The Pacific Mill chimney stack is the major vertical accent of the area.

Running parallel to the Merrimack River, the North Canal (Map 1; Photo 1; NR 1975), was begun in 1845 and completed in 1848. It is 5330 feet in length and ranges in width from 100 feet at the gatehouse to 60 feet at the Spicket wasteway, were it empties. Water enters the canal from the Essex Company mill pond above the dam. The canal is 12 feet deep at the head and 13 feet at the wasteway. In section, the canal is trapezoidal, with 4-foot retaining walls of random coursed granite blocks throughout its length. The granite rubble bottom is sealed with clay puddle. Several mills continue to use the canal's water, which delivers an average of 4000 cubic feet per second of water. Running parallel to the canal and 80 feet to the south is a line of sheet pilings. A single navigation lock at the head of the canal has been removed, but the lock walls remain. A set of three navigation locks at the end of the canal have been filled in. The canal is still maintained by the Essex Company.

The Great Stone Dam (Map 2; Photo 2; NR 1977), was built between 1845 and 1848 at the site of Bodwell's Falls, where the Merrimack drops approximately five feet. Footed on a bluestone bedrock ridge, the dam was built to pond up approximately thirty feet of water. The dam face is constructed on a trench of 8-foot by 18-foot granite blocks, laid in hydraulic cement and dowelled to the riverbed and to each other. The dam varies in height between 30 feet and 41 feet and is 35 feet thick at the base and 13 feet at the top. With its wing walls of dressed granite, the total length of the dam is 1629 feet. A 900-foot section spans the river; a 405-foot north wing connects to the North Canal; 2 324-foot south wing connects to the South Canal which was built in 1865. A concrete fishway was constructed in 1917, and a hydroelectric plant begun in 1978, but the dam has not been otherwise altered or repaved since its completion in 1848.

The Gatehouse (Map 2; NR 1975, as part of North Canal), completed in 1848, has 24 gates which are now electrically operated and control the amount of water entering sluice-ways. The exterior of the wooden frame gatehouse is clapboard-clad, with seven windows along each side. The Greek Revival Style treatment of the exterior includes wide pilasters at the corners, returns at the eaves, and a glazed transom over the entry. The 1845 Gatekeeper's House (Map 3; Photo 3) completes the complex. This small, clapboard-clad, gable-roofed Greek Revival house has a three-bay facade with central entry. The building rests on a granite rubble foundation. The entry is enframed by pilasters and a four-paned glazed transom. A series of real ells are perpendicular to the main structure. A pitched-roofed clapboarded barn (ca. 1860) is located to the rear of the house.

Pacific Mills

Immediately to the east across Broadway is the flat-roofed five story #2 storehouse of the Pacific Mills Company. (Map 5; Photo 4). Built ca. 1860, it is the earliest remaining building of the once-extensive Pacific Mill Yard. The small, asymmetrically-placed windows with granite sills are characteristic of early warehouse construction. The upper story is articulated with heavy corbelling between small attic windows. The southern portion of this early storehouse has been demolished. Two fragments of the 1852 granite rubble-walled Pacific weaving mill remain to the east of the storehouse.

The brick cotton weaving mill of the Pacific Mills, built in 1890, runs its full 300-foot length along the canal (Map #4). Known as the Upper Pacific, the flat-roofed two-story building was among the last additions to the Pacific Mill complex. Large, segmental arch windows with brick voussoirs and granite sills have not been altered in a recent renovation of the building. A tall, octagonal chimney was constructed in 1873-74 to allow the Pacific Mills to add steam to their operation. This once-free-standing chimney, designed by Hiram F. Mills of the Essex Company, is now enclosed by the Upper Pacific weaving mill. Two enclosed penstock racks, which channeled water into the turbines, are still intact in the canal wall. The Pacific Mill Company office at the western end of the weaving mill was constructed in 1887 after plans by Boston architect George Moffette, Jr. The two-story office rests on a high dressed granite foundation; round-arched Renaissance windows distinguish it from the functional treatment of the attached weave shed. Two buttresses, decorated with vertical brick panels, are carried above the decorated brick cornice. The buttresses flank the now-altered entry.The Pacific Mills cotton complex, constructed across the canal in the 1890s, is largely intact. The Pacific Mills Cotton Spinning Mill, a six-story flat-roofed brick structure built during 1888-89 (Map 13, Photo 5), and the #6 storehouse, a seven-story brick structure built in 1896, are located across the canal between methuen and Canal Streets on a site formerly occupied by Pacific Mills boarding houses (Map 15, Photo 5). The adjacent #7 cotton yarn mill (Map 11), built in 1905, is distinguished by molded brick entry ways; both buildings are of otherwise functional slow-burning mill construction. The one-story storehouse (1896; Map 15) and a six-story worsted mill (1910; Map 14) were among the last additions to the Upper Pacific Complex. All are of standard,

flat-roofed, brick mill construction. A ca. 1920 "addition" to the complex was the "Jerry's Broadway 5 Diner," a steel-clad, streamlined Modern diner which abuts the #7 mill. (Map 11)

At the eastern edge of the Upper Island, the Atlantic Mill Company spinning mill stands on the former site of a large complex constructed by the Essex Company in 1846 for the Atlantic Mill Company, as the second mill to begin in operation in Lawrence (Map 9, Photo 6). All of the original Atlantic Mill buildings have been razed, many when the Central Bridge was built in 1918. The present two-story brick building was constructed between 1906 and 1910 as a weaving shed. Its flat roof, large-segmental-arch windows, and undecorated brick piers well exhibit functional mill design after the turn-of-the-century.

At the eastern edge of the Upper Island, the Atlantic Mill Company spinning mill stands on the former site of a large complex constructed by the Essex Company in 1846 for the Atlantic Mill Company, as the second mill to begin in operation in Lawrence (Map 9, Photo 6). All of the original Atlantic Mill buildings have been razed, many when the Central Bridge was built in 1918. The present two-story brick building was constructed between 1906 and 1910 as a weaving shed. Its flat roof, large-segmental-arch windows, and undecorated brick piers well exhibit functional mill design after the turn-of-the-century.

Situated between the Upper Pacific and Atlantic Mills, the extant Upper Pacific Bridge, designed by Thomas W.H. Moseley, was constructed in 1864 to replace an earlier bridge on the same site (Map 10, Photo 7). The five-panel, 18-foot wide bowstring truss has a 100-foot span. It is the earliest extant Truss Bridge along the Canal.

At the intersection of Canal and Amesbury Streets is the Atlantic Cotton Mills boarding house (Map 17, Photo 8). Built in 1847, the boarding house was originally part of an extensive complex of company-owned housing along Canal Street and is one of only two boarding houses to survive in the district. The seven-bay, pitch-roofed red brick structure rests on a granite rubble foundation. Five pedimented dormers light the attic; six original chimneys are intact. Rectangular windows have six panes and double-hung sash, with granite sills and lintels. The building is currently in commercial and residential use. One bay of the ground floor was remodelled into commercial space ca. 1928; a concrete block, two-story addition abuts the boarding house on the west.

The Middle Islands: Amesbury to Union Streets.

The Middle Island, between the Central and Union Street Bridges, is the site of the Bay State Mills, the first mills to go into operation in the city. The Middle Island contains an early Bay State boardinghouse and railroad shed from the 1870s and extensive complexes of the Lower Pacific and Washington-American Woolen Company mills and their related powerhouses and boilers. The Pemberton Mill, a nearly unaltered mill from the 1860s, is among the outstanding architectural examples of the Middle Island. As the district is configured, the northern boundary runs to Essex Street, encompassing the Essex Company offices, a public school, and a stable. This area has most of its land

area devoted to industrial structures, and is compactly built at both the Merrimack River and North Canal edges. Many structures abut each other, creating continuous facades which incorporate several periods of mill development.

Lower Pacific Mills

Situated near the Central Bridge, the Lower Pacific Mill was built in 1864 on the so-called Central Mill Site of the Essex Company (Map 20, Photo 9). Originally two stories high, the worsted woolen mill was enlarged in 1877 with the addition of two stories and a mansard roof. It retains its original triple-sash windows, but the mansard roofs have since been removed. The building was again enlarged in 1908 to its present 150 by 350-foot size. The original east and west elevation fenestration of double windows recessed in prominent bays has been altered by the blocking of many windows; the Canal facade has had few alterations to the projecting six-bay central pavilion with its tall segmental-arch windows; office entries are distinguished in prominent brick arches carried by brick piers. The Lower Pacific complex includes a brick one-story engine house with a hipped roof which terminates in a monitor (Map 21, Photo 9). Built in 1885 after plans by mill architect Charles Main, the original octagonal stack is intact, and three water turbines dating from 1914-1923 are still in use. To the west of the engine house is a portion of the 1883 brick Lower Pacific cotton mill (Map 19). A portion of the west wall of the earlier Pacific Mills on this site is visible at the west of the mill yard.

The brick five-story, 100 by 275-foot Lower Pacific finishing mill and dye house, built ca. 1911, is connected to the worsted mill by a bridge, and abuts the Washington Mills-American Woolen Company complex at the west (Map 22). Across the canal, the brick, flat-roofed, two-story-plus-basement Lower Pacific weaving mill, built ca. 1895, has an irregular rectangular plan and utilitarian, large window elevations (Map 24). At Appleton Street and Canal Street is the 1870-1875 Lower Pacific Bridge (Map 25). The Pratt-Style truss, eight-panel bridge has a span of 90 feet and is 20 feet wide. The vertical members are stamped "Phoenix Iron Works, Philadelphia."

The 1882 five-story brick Lower Pacific finishing and packing building is identified by "Lower Pacific Mills," set in granite on the north wall of the bell tower (Map 23, Photo 10). The prominent buttressed bell tower/stair tower has a pyramidal roof with weathervane which covers an open belfry. Ornamental ironwork is set into the opening; granite stringcourses and thick lintels over narrow, glazed windows enhance the fortress-like appearance of the tower. The main office entry leads to an elaborate stair; the hall immediately after the entry has a coffered ceiling and woodwork which contrasts with the functional treatment of the mill spaces beyond.

Bay State-Washington Mills-American Woolen Company

The Washington Mill Company mills (after 1899, part of the American Woolen Company) and related structures occupy the site of the Bay State Woolen Mills, which were begun in 1846. The 1886 worsted mill of the Washington Mill Company is a five-story plus basement, flat-roofed structure with uniform rows of segmental arched windows built over

a portion of an 1848 mill which remains fragmentarily as a storehouse (Map 27, Photo 11). "1886" is set in granite under the open belfry of the stair/bell tower below a granite stringcourse. The stair tower is differentiated from the mill's uniform fenestration by paired round-arched windows. A six-story extension of reinforced concrete and brick was constructed between 1909 and 1925 after designs by Charles T. Main (Map 28, Photo 11). To the south of this building is the flat-roofed 1886-87 River Mill, a 475- by 93-foot seven-story brick building of functional design and exterior treatment (Map 32). A single stair tower breaks the uniform facade of segmental-arch windows between brick piers. A 100- by 233-foot, one-story steel frame brick-faced addition was constructed at the north in 1953. The 1886-87 rebuilding was supervised by the Lockwood-Breene Company of Boston, leading mill engineers with a national practice. The two-story Renaissance Revival powerhouse, built in 1923 for the American Woolen Company, is situated to the north of the River mill. The upper story of the powerhouse has been altered; large round-arched windows with granite keystones and sills are intact (Map 40).

Across the canal is the ten-story American Woolen Company storehouse #10, built in 1919 of brick and reinforced concrete after designs by Charles T. Main (Map 29, Photo 10). This building replaced earlier storehouses and boardinghouses of the Washington Mill Company, which was absorbed by the American Woolen Company in 1899. The Georgian Revival-inspired Washington Mills office was built in 1900 on the former site of Bay State Woolen Mill Company boardinghouses (Map 31, Photo 12). A distinctive entry with its two splayed engated and two free standing rusticated columns is centered against the rusticated first story. Its prominent voussoirs and keystones of brick and stone over the rectangular windows make it one of the most style-conscious buildings in the district.

To the east, the American Woolen Company storehouse, built in 1900, is credited to Charles T. Main. The six-story, 160- by 170-foot building has staggered small windows with granite sills (Map 34). A low pitched mill roof flanks a central stair tower.

Among the earliest buildings in the entire district is the 1848 Bay State Woolen Company railroad shed (Map 41, Photo 13). The brick, pitched-roofed building with a buttressed north end rests on a rubble granite foundation. Measuring 227 by 37 feet, the building is the only remaining Bay State industrial building. Across the canal, the Bay State Woolen Company boarding house, built ca. 1847 after designs by Phineas Stevens, is a pitched-roofed brick structure which rests on a rubble granite foundation (Map 30, Photo 14). The eleven-bay facade has rectangular windows trimmed with granite sills. Six-paned, double-hung sash is intact. The surrounding Bay State boarding houses have been demolished. The building is currently in use as a warehouse.

Among the most architecturally distinguished of the remaining nineteenth century mills is the Pemberton Manufacturing Company main mill, built in 1860-61 after the design of German-trained architect Theodore Voelkers (Map 42, Photo 15). The five-story woolen mill has a trap door monitor in the pitched roof; the prominent stair towers have gambrel roofs. The crenellated cornice and traceried Romanesque windows are evocative of Voelkers' work at the Andover Town Hall. A portion of the foundation of the 1853 mill which collapsed on this site in 1860 is still in place.

A three-story, flat-roofed Pemberton Company storehouse (Map 35), built ca. 1890, is situated immediately opposite the mill and was connected to the main mill by a railroad bridge. A ca. 1880 square, flat-roofed brick Pemberton Manufacturing Company stable is immediately east of the Pemberton warehouse. Although the Methuen Street facade has been altered, the large rear entry and details, such as prominent brick hood moldings at the east elevation, are intact (Map 37).

Lawrence Duck Mills

The 200- by 40-foot Lawrence Duck Company mill is a brick structure dating primarily from 1906 when there was an extensive rebuilding of the original 1853 mill complex. Charles T. Main is credited with the rebuilding (Map 44).

Walton School

At the northern edge of the District between Newbury and Essex Streets is the pitched-roofed Queen Anne style brick Walton School (Map 36, Photo 15A). Built ca. 1890 by the City of Lawrence, the Walton has most ornamental detail confined to a raised panel pattern which terminates in a fanlight at the west elevation. Ornamental iron cresting has been removed from the hip-roofed pavilion; a prominent round-arched entry with brick hood molding and corbel stops is an unaltered original feature.

Essex Company Office and Yard

The Essex Company Office and Yard, which includes five red brick, flat-roofed structures dating from 1883-84, is an intact complex of utilitarian buildings (Map 39, NR 1979). Although austere, the buildings, which were designed by Hiram Mills, chief engineer of the Essex Company, have corbelled cornices and granite trim. The Essex Company Offices and Yard have been in continuous use since their construction. The complex includes an office, carpenters' shop, foundry, garage, and storage building, and is surrounded by a red brick wall which was constructed at the same time as the buildings were.

The "Lower Island": Union Street to Marston Street

The Lower Island, between the Union Bridge and the Marston Street entrance to Canal Street, is the site of the locks and wasteway of the North Canal, where the canal waters rejoin the Spicket and the Merrimack Rivers. The Lower Island is also the site of the Essex Company's Lawrence Machine Shop (1848), a sanitation plant, paper mills, foundries, and the woolen and cotton mills built by the Everett and Kuhnhardt Mill Companies.

Because of the length of the Everett Mills and the size of the paper mill site to the east, the district continues north to General Street, and runs south along the Spicket River. Across the canal along Island Street, the smaller-scale structures occupy an asphalt paved surface, while the land at the eastern tip of the island is largely river grass and brush, in great contrast to the intensively used turf of the preceding mile along the canal.

Everett Cotton Mills

When built in 1909, the main mill of the Everett Mills company was the largest cotton mill in existence (Map 46, Photo 16). Twelve acres of floorspace are contained in the six-story, 780-foot flat roofed building. The Everett mill is actually two buildings joined by a central pavilion: the north structure is 460 by 100 feet, and the south is 32- by 75. The segmental-arched, multi-paned windows are recessed between unbroken brick piers which terminate in a corbelled cornice. The central pavilion is composed of ashlar granite piers which carry a four-story, round-arched entry flanked by granite capped piers with deep recesses. A granite trimmed, Roman numeral clock is centered over the arcade. "Everett Mills" is set in granite over the prominent voussoirs of the entry. The original Everett Company doors, which provide entry to the mill and to the former machine shop buildings in the rear yard, are intact. The first floor interior of the Everett mills is relatively unaltered. The payroll office, watchman's office, and vault are in nearly the same condition as when the mill ceased operation in 1929. Dado panelling and other finishes are in near-original condition.

Essex Company Machine Shop (later Everett Cotton mills)

Behind the main Everett mill is the Essex Company Machine Shop (Map 48, Photo 17, NR 1972), built in 1846-48 for the manufacture of tools, water turbines, and textile and other machinery. Sold to the Everett Mills Corporation in 1857 for use as a cotton mill and substantially added to, the original buildings are distinguished by their ochre-colored walls of granite rubble. The four-story 405- by 65-foot building is covered by a steep gable roof, interrupted by skylights. Three stairtowers are evenly spaced along the west facade. Notable features are two globe windows in the gables of the north end and central stair tower. A two-story forge shop, 43 by 225 feet with a pitched roof, is east of the machine shop. The L-shaped foundry has been altered by the addition of extra stories. A boiler house is attached to the foundry. The 125-foot circular chimney, constructed entirely of granite, is an intact original feature of the 1846-48 complex. To the south, the brick cloth room of 1850 was used as a storehouse between 1889 and 1929 (Map 51). Although the power mill has been removed and the original wooden windows replaced by steel, the corbelled cornice of the original design is intact.

The #6 storehouse of the Everett Mill Company was built immediately to the south of the cloth room in 1863 as a weaving mill (Map 52, Photo 18). Originally a two-story building with pitched roof, clerestory windows on the south side, and dormers on the north, the third story was added in 1946. Among later additions to the original complex are the 237- by 107-foot, four-story brick Everett mill storehouse built in 1892 (Map 49). The structure has a flat roof and a prominent stair and water tower at the west elevation. A seven-story brick storehouse measuring 150 by 50 feet was constructed along the Spicket in 1905 (Map 53).

George E. Kuhnhardt Corporation

The six buildings of the George E. Kuhnhardt Woolen Mills were built between 1880 and 1916 on the site of the earlier Lawrence Mills. The earliest extant buildings, ca. 1890, are brick. The three-story flat-roofed main mill and office has a prominent corner tower with an open belfry. The adjoining mill #2 and freestanding two-story wool shop are executed in red pressed brick (Map 56, Photo 19).

Hamblet Foundry

The Hamblet Foundry complex includes an 1859 wood-frame section built by the Webster-Dustin Machine Company, manufacturers of millwork (Map 60). The Hamblet Company purchased the buildings in 1899; numerous alterations were made after a fire in 1902. The hip-roofed office portion fronting on Island Street was added in 1925. The Hamblet Company manufactured paper mill machinery.

Lockkeeper's House

The Greek Revival style Essex Company Lockkeeper's House, ca. 1848, is a three-bay, central entry two-story frame building which rests on a granite rubble foundation. The original clapboard siding has been replaced, but the returns at the eaves and cornice are original clapboard siding has been replaced, but the returns at the eaves and cornice are original features. Late-nineteenth century turned posts have been added to the shallow porch of the small structure (Map 65, Photo 20).

Experimental Sanitation Station

The Lawrence Experimental Sanitation Station is on a site first developed in 1889 and subsequently re-engineered. The existing laboratory and office structures were built in 1950-1952, partially covering the original filter beds of the original installation. (Map 64).

Russell Paper Company

The Russell Paper Company storehouse was built about 1853 of granite rubble (map 68, Photo 21). Picturesquely situated along the natural incline of the riverbank, the storehouse has exposed reinforcing rods and brick voussoirs and sills over the segmental arch windows. The adjoining storehouse dates from ca. 1875 and is of asbestos-covered wood-frame construction (Map 67).

The Spicket Penstock (map 69; Photo 22), below the Prospect Street Bridge (1855; Map 70), was built in 1855 to provide water from the canal for the turbines of the paper mills on the east bank of the Spicket. The original wooden penstock has been replaced with the current steel and concrete system.

8. Significance North Canal Historic District, Lawrence, MA

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	X community planning	___ landscape architecture	___ religion	
___ 1400–1499	X archeology-historic	___ conservation	___ law	___ science	
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture	
___ 1600–1699	X architecture	___ education	___ military	X social/ humanitarian	
___ 1700–1799	___ art	X engineering	___ music	___ theater	
X 1800–1899	X commerce	___ exploration/settlement	___ philosophy	___ transportation	
X 1900–1925	___ communications	X industry	___ politics/government	___ other (specify)	
		X invention			

Specific dates See Text **Builder/Architect** See Continuation Sheet

Statement of Significance (in one paragraph)

The North Canal Historic District possesses integrity of location, design, setting, materials, and workmanship. The mills, factories boardinghouses, locks, dams, and bridges are significant for their association with the nineteenth century development of Lawrence as one of America's leading planned textile centers. Nationally and locally important businessmen, inventors, architects, and engineers are connected with the development of the mills over an 80 year period. The area embodies the distinctive characteristics of mid-nineteenth to early-twentieth century industrial architecture and represents a distinguishable entity from that period. The North Canal Historic District thus meets criteria A, B and C of the National Register of Historic Places. The District is architecturally and historically important at local, state & national levels.

Led by Abbott Lawrence, the first phase of development of the City began with the incorporation of the Essex Company in 1845 for the "purpose of constructing one or more locks and canals in connection with said dam.. and to create a water power to use, or sell, or lease to other persons or corporations for use for manufacturing and mechanical purposes..." The North Canal thus became the industrial focus of the town.

Led by the same financiers and manufacturers who developed Lowell as a textile center, the Essex Company was formed for the purpose of developing the water power ten miles below Lowell, below Bodwell's Falls on the Merrimack River. The Company purchased 4,313 acres of land north and south of the river from Methuen and Haverhill landowners and laid out the area in accordance with the plans of Essex Company engineer, Charles S. Storrow. The Essex Company secured the right to develop and lease the water power of the river and canal. Between 1845 and 1855, the company made most of the major improvements in Lawrence, including construction of the dam, locks and canal, lumber dock, machine shop, mechanics tenements, the Atlantic, Pacific, Pemberton and Duck Mills, and a paper mill. Storrow's plan for Lawrence oriented a grid of approximately 60 square blocks to the river and the mill island formed by the construction of the North Canal. The system of functional zoning established by Storrow is evident today: company housing was concentrated on the first two blocks across the canal from the industrial zone; a commercial district was assigned to Essex Street; and a civic district was planned to focus on the Lawrence Common. Lots for institutional and residential use were platted throughout the rest of the Essex Company lands and sold at auctions in 1846, 1847, and 1855. Deed restrictions specified building height and construction relative to the area and the use of the building.

As the focus of Lawrence's early industrial development, the first textile mills, factories, and boarding houses were located on the canal sites leased or purchased from the Essex Company. The land between Methuen Street and the canal and along the canal island between Broadway (the Essex Turnpike (1804)) and the Spicket River was built with a succession of mills which replaced obsolete structures. Along the North Canal of the Merrimack, newly-developing textile-manufacturing technology came together with favorable market conditions, a large supply of labor, and large-scale industrial investment. The area was well serviced: a sewer system and a reservoir were provided by the Essex Company; gas light was introduced in 1848; regular passenger train service on the Boston and Maine Railroad was established in 184[illegible]

1845 - 1860

Between 1845 and 1848, water power engineer and Essex Company treasurer, Charles Storrow (1809-1904), laid out the plans for the dam, canal, and town. Engineer Charles Bigelow, supervised the construction. The engineering of the North Canal and Lawrence (or "Great Stone") Dam exploited the latest American, French, and English technologies, and developed ideas tested at the earlier Merrimack Valley industrial towns. A notable advance over the previous twenty years of mill-city building was the incorporation of railroad spurs in the original plan. The water power created by the dam was enhanced by the development of water turbines, which improved the technology of the earlier breast wheels. Steam power would begin to be widely utilized by the 1860s, however, dictating changes in mill design. The gatehouse, gatekeeper's house, and lockkeeper's house, which were constructed with the dam and canal, are significant markers of the terminal points of the canal. The gatekeeper's house, (Map 3) with its Greek Revival entry, and the gatehouse, (Map 2) with its simple but thorough Greek Revival treatment, are of particular interest. The site of the gatekeeper's house is quite intact, with a variety of original landscape details such as granite walls and steps.

On the zoned plan created by Charles Storrow, the groundwork was laid for the later development of North Canal industries between 1845 and 1860. In contrast to the engineering advances evident in the construction of the canal, which permitted later adaptation as technology improved, the first generation of tall, narrow, brick and stone mills was made obsolete by large fireproof buildings of the later nineteenth century. Despite tension between Yankee management and irish immigrant workers, this early period saw manufacturers' accommodation to workers in the institution of the boardinghouse, and the extension of benefits to operants within the workplace.

The first substantial building to be constructed along the Canal was the Essex Company Machine Shop, built by the Essex Company in 1846 (Map 48). The four-story factory of granite rubble was part of a complex which included a forge, a foundary, and a boiler house. The factory provided a variety of machinery and goods, including locomotives, Hoadley engines, and millwork. Although utilitarian in purposes and overall appearance, the Machine Shop is ditinguished by its ochre-colored granite rubble walls and globe windows set into the gable ends of the pitched roof. Fire regulations would soon prohibit the use of such stone construction and pitched roofs.

In 1846, the Bay State Mills and Atlantic Cotton Mills corporations were formed and mill sites and mill power rights purchased from the Essex Company. Both developments were planned as large-scale endeavors: the Bay State Mill Company buildings, erected at cost by the Essex Company and supervised by Colonel Phineas Stevens, included three pitched-roofed brick woolen mills surrounded by a row of three-to five-story buildings. Four blocks of brick boarding houses were built across the canal between Jackson and Newbury Streets; each block accommodated about 36 boarders. It is interesting to note that, unlike the situation in nearby Lowell, the Lawrence boardinghouses were not gender-segregated.

In 1846, at the "Upper Island," the Atlantic Cotton Mill built two of four planned mills; a third was added in 1852. machinery was supplied by the Lawrence Mechanics

Shop; Charles Bigelow, Essex Company Engineer, supervised the construction of mills and associated water power structures, wheel pits, and waterways. Atlantic workers were housed in six blocks of boardinghouses located on Canal and Methuen Streets, between Hampshire and Lawrence Streets. The first opened in 1847 and was reportedly the first brick dwelling erected in the city. With these two early narrow, multi-story textile mills and their boardinghouses, the architectural character of Lawrence's mill complexes and its nearby housing was established. The surviving boardinghouses are relatively unaltered and show the conservatism of the early builders. Simple details, evocative of the brick neoclassical architecture of Charles Bulfinch, are evident in the gable returns with corbel tables and rectangular, granite-trimmed window and door openings. With their conservative exterior treatment and silhouettes echoing the nearby mills, they are representative of the early "corporate style" used in Lowell and Manchester. The small scale of the surviving Bay State boardinghouse (Map 30) and Atlantic Cotton Mills boardinghouse (map 17) contrasts sharply with the later mill developments around them.

In 1852-53, the Essex Company, under the supervision of Charles Bigelow, constructed a six-story mill for the Pacific Mill Company. The six-story mill of coursed granite rubble was designed for the production of ladies' cotton and woolen dress goods. A continuous row of two- and three-story buildings enclosed the mill; no workers' housing is documented, but is probably existed. An early producer of worsted goods, the Pacific would develop into the largest and most important of the mill complexes, producing 65,000,000 yards of cotton and worsted goods by 1877. The Pemberton Mill, designed to produce cotton and woolen goods, was built by the Essex Company in 1853; workers' housing was constructed opposite the mill across the canal. In 1860, a disastrous collapse and fire killed 88 operatives; the Pemberton Manufacturing Company mill was rebuilt in the same year on the original site (Map 42). The Romanesque design of the mill, among the most style conscious in the district, is executed with the corbel table in the gable end; the five-story pitched-roofed building has mansard-roofed stairtowers at the east and west elevations and a trap-door monitor; the north and south facades are broken by round arched windows. Immediately to the east, the Lawrence Duck Mill was built in 1853-54 by the Essex Company (map 44). The Everett Mill Company purchased the bankrupt Essex Company Machine Shop (Map 48) in 1857 and converted it to a cotton mill with the addition of several new structures.

The Bay State Mills, known for their "Bay State Shawls," were closed by the Panic of 1857; they reopened in 1859 under the ownership of the Washington Mills. A variety of innovations would be associated with the skill-solvent Pacific Mills, including introduction of ring spinning spindles and the Wade bobbin holder. The Pacific Mills management established a library for employees and were pioneers in the establishment of a Relief Fund for operatives. In 1869, under the leadership of E.R. Mudge, the Washington Mills installed worsted machinery imported from France, which allowed it to become the first provider of all-woolen worsted goods in the United States.
Textile manufacture was the main endeavor of the "New City," or "Merrimack," as it was briefly called. Paper and textile manufacturing machinery and paper manufacture along the canal also began during the early period. The earliest industries showed the diversification between cotton and wool and worsted wool that would be a key to the

long-term success of the city through the many business failures and depressions, the first of which occurred in 1857. As noted in an early historical account, "profits were prospective" during the first decades. Experimentation with cotton and worsted manufacturing techniques and machinery aided the long-term success of the first companies.

The financial Panic of 1857 and the Civil War mark the end of the first major period of growth, in which the population rose from approximately 150 (1845) to 17,639 (1860). Lawrence was established in the same year as the Irish potato famine; Irish workers accounted for 33 percent of the work force in 1848, and 40 percent by 1860. Women and children made up a substantial portion of the work force throughout the nineteenth century.

1860-1912

The period between 1860 and 1912 is significant for its tremendous increase in size - of the workforce, mill buildings, and company structures. Extant buildings along the canal evidence the impact of new fire regulations, new forms of power, including electricity, and larger manufacturing equipment. By the turn of the centry, conglomerates dominated the once-decentralized ownership of the mills. As the companies expanded, development jumped across the canal, and boardinghouses were razed for the construction of new weave sheds and storehouses. The demolition of the boardinghouses altered the carefully-zoned plan instituted by the Essex Company in 1845. The ca. 1860 Walton School was constructed at the beginning of an era which required public schools for a large boardinghouse population (Map 36).

Between 1860 and the Strike of 1912, Lawrence's population grew from 17,639 to 34,916 in 1875, to 85,892 by 1910. In 1910, there were 41,319 foreign-born, representing 51 countries; 6,693 Italians, 4,336 Russians, and 2,077 Turks were the latest additions to the previous Irish, French Canadian, English, Scotch, and German populations. By 1905, Lawrence had the highest percentage of foreign-born citizens in Massachusetts (46.08%).

Encouraged by the protective tariffs on imported cloth, new technological developments, mass-market potential, and an initial Civil War demand, Lawrence became the world's leading center of worsted woolen goods. The emphasis on long-fiber worsted goods began in the 1860s; the Pacific Mills were the largest producer prior to the Civil War. Imported machinery from French and England assisted in the growth of worsted production. Worsted and cotton production remained steady during the Civil War; diversification sustained the textile industries through the post-Civil War era and through periods of fluctuating demand until the depression of 1893. In 1893, all mills temporarily ceased production with the Gorman-Wilson Tariff and the reduction of protective tariffs, and the appearance of imported goods. Recovery over the following years saw a peak of wages and output in 1909 and the appearance of conglomerate firms, notably the American Woolen Company.

By 1860, slow-burning or fire-resistant construction, consisting of plank design, flat-roofed, heavy-timber-framed masonry-clad construction replaced the previous

methods, particularly the pitched-roof, stone-walled mill. The wider mills (typically 100 by 125 feet), accommodating new, heavier machinery of the post-1880 period, replaced the narrow structures of the previous decades. The wider buildings required larger windows for improved light and advanced heating systems to compensate for heat loss. Better light and ventilation also served the operatives, who gained improved working conditions during this period. Long working hours prevailed, however, Motive power changed almost entirely from water power to coal fired steam power by 1880. Electricity was introduced in the mid-1880s and the introduction of reinforced concrete to mill design at the turn of the century marked sixty years of evolution of "modern" mill construction. Fire insurance companies were partially responsible for the change in mill construction standards, encouraging the adoption of floors and flat roofs of heavy plank and the elimination of concealed spaces within the mill. Sprinkler systems were introduced in 1875.

During the last half of the nineteenth century, new mill sites were developed and old ones rebuilt. Boardinghouses north of Canal Street were razed for the construction of new mills and storehouses, and mill operatives found housing farther from the workplace. The ubiquitous three-decker appeared in Lawrence at the turn of the century; larger tenements of four or more units absorbed the growing population. Lawrence struggled with a high death rate and numerous public health problems, including overcrowding, during this period.

Although the North Canal remained the center of Lawrence's textile and paper industry, the construction of the South Canal in 1865 and subsequent development of the mammoth Wood (1905-1906), Ayer (1908-1909), and Prospect Mills (1909) south of the Merrimack, Coupled with the development of the Arlington Mills along the Spicket, diffused the previous concentration of North Canal land use.

In 1864, the Pacific Mills built the two-story Lower Pacific Worsted Mill (Map 20) on the central mill site, the last major mill site to be developed along the North Canal. Also known as the Central Pacific Mill, the 450-foot long building (with a 1908 150-foot addition) accommodated new power driven jacquard looms. The four-story mill (enlarged by two stories in 1877) was the first of a series of new buildings and improvements on the Pacific Site, and is representative of the architectural treatment of a large post-Civil War mill. The windows for the first two stories have heavy segmental arch lintels; the 1877 expansion did not repeat this treatment but allowed a corbelled cornice. Other improvements to the Pacific site included the 1882 finishing/packing building (Map 23); an 1895 worsted mill (Map 24); and a 1911 finishing mill (Map 22). The engine house (Map 21) was built in 1885 after the designs of superintendent Charles T. Main, who would become Lawrence's leading mill architect and president of the American Society of Mechanical Engineers.

In the 1880s and 1890s, there was increasing development of fire-retardant methods of construction. Greater reliance on steel framing, rather than the earlier cast iron and timber, allowed large wall areas to be given to windows. The attention to architectural detail evident in the earlier Pemberton Mill (Map 42) was generally abandoned in the functional mills of the period from 1880 to 1925. The flat-roofed, large-windowed weaving sheds and storehouses of the late 19th century have uniform facades of

segmental-arched or rectangular windows deep set between undecorated brick piers or pilasters. Representative of the large brick mills and related structures of the period is the 1882 Lower Pacific finishing mill (Map 23). The five-story mill has a corbelled cornice, and a uniform window treatment. The outstanding architectural feature is the corner bell tower with its ornamental ironwork and corbelled opening, and final-topped pyramidal roof. Along with the Kuhnhardt woolen mill tower of ca. 1890, this is one of the visual landmarks of the canal district (Map 55).

The Pacific Mills were of pressed red brick in the flat-roofed, utilitarian style encouraged by the fire insurance companies. At the Pacific Mills Upper Canal Site, the new Renaissance Revival office of 1886-87 and the utilitarian weave shed of 1890 were part of development which eventually moved across the canal to raze boarding houses for new spinning and storehouse structures. The Pacific Mills of the last decade of the 19th century were supplied with the "plenum" ventilation, heating, and humidification system developed by B. F. Sturtevant of Boston. Vertical brick flues were built on top of exterior brick piers, carrying warmed air through the mill. Heaters and blowers were located in the basement.

In 1886-87, the Washington Mills rebuilt the original Bay State Woolen Mill site with the three-building complex designed and construction concern in the United States (Map 26,.27, 32). the chimney was constructed in 1886. At 250 feet, with a ten-foot flue, it was the second tallest chimney in New England. Two of the mills were 104 feet wide and 400 feet long; they were then considered to be "too" wide, but soon were exceeded in width. the Washington Mills were the largest woolen mill in the United States until the 1890s, when manufacture shifted to worsteds.

When the conglomerate American Woolen Company, headed by William M. Wood, absorbed the Washington Mills in 1899, a substantial building campaign commenced, introducing new building heights and materials to the North Canal. Between 1909 and 1925, the company built a reinforced concrete addition to the Washington Worsted mill (Map 28). This was among the first large-scale applications of reinforced concrete along the canal. The new material offered fire protection, durability, lightness, freedom from vibration, and lower insurance rates. Steel provided the tensile strength, and allowed greater areas to be devoted to windows. The expansion allowed the Washington Mills to increase production of men's wear: by 1920, the company employed 6,500 persons, and the parent American Woolen Company owned 50 mills and employed 35,000 persons.

The Pemberton and Lawrence Duck Mills remained smaller-scale operations, but added to their physical plants. The Pemberton Mills constructed two storehouses on Canal Street opposite the main mill, including the ca. 1900 storehouse adjacent to the Everett main mill (Map 47). Until their closing, the Duck Mills continued their specialty of cotton duck, particularly for use in sails.

In the 1890s, the Everett Cotton Mills began a series of improvements on the former Essex Company Machine Shop yard. The 1892 #4 mill, 1900 boilerhouse, and 1905 storehouse preceded the 1909 construction of the monumental six-story, 650- by 75-foot cotton mill, which was then the world's largest (Map 46, 49-52). Twelve acres of floorspace are contained under the flat roof of the six-story, heavily-buttressed brick

building (Map 46). The Everett Mill retains its original integrity, with the unbroken vertical members which flank the granite-trimmed central pavilion and clock. The Everett was the last of the large-scale brick mills to be constructed along the Canal.

Paper manufacture in Lawrence was dominated by the William Russell Company, which expanded from a Prospect Street site to the property east of the Everett Mills. With the introduction of Christian and Henry Voelker's patent to manufacture paper from wood pulp, the firm became a leading manufacture of coated papers used in periodical and book production. The Champion International Paper Company purchased the Russell firm in 1900. The extensive, one-and-one-half-acre complex is now in ruins (Map 71).

The growth of Lawrence as an industrial center was accompanied by a scientific interest in understanding the impact of industrialization and urban growth on public health. The Lawrence Experimental Station, located on Island Street (Map 64), began operating in 1886 in quarters lent to the Massachusetts State Board of Health by the Essex Company. The Station was under the direction of Hiram F. Mills (1836-1921), referred to as the "Father of American Sanitary Engineering." The surviving structure was built in 1916 and served as the laboratory for water sanitation and sewerage treatment experiments until a new complex was built in South Lawrence in 1953. The Lawrence Experimental Station was the first research facility of its kind in the United States.

1912-1945

After 1912, the North Canal mirrored the economic changes which were occurring throughout the New England textile industry. The conglomerates struggled with the demands of workers over wages and benefits, and large-scale expansion declined sharply between the wars.

The wool industry had been characterized by a low level of union activity during the previous decades. the first strike occurred in 1881 over the issue of wage reduction. The important 1912 Lawrence strike was precipitated by the 54-hour work law passed by the Massachusetts General Court, which had the effect of reducing work hours for men as well as the intended group of women and children. The strike activities, including violent demonstrations, lasted from January 10 to March 14 and affected 27,000 operatives. Lawrence's newest immigrant workers, including Italians and Syrians, were identified as the greatest supporters of the strike. The strike resulted in a general wage increase from large conglomerate manufacturers and drew national attention to child labor and poor living conditions in Lawrence.

The first two decades of the twentieth century were marked by steep fluctuations in the textile manufacturing industry and the beginning of permanent decline. The Atlantic Cotton Mills, whose spinning machinery first went into operation in 1849, were bought at an auction by the Pacific Mills in 1913.

During World War I, wages increased and work hours were reduced. A strike in 1919 resulted in the adoption of a 48-hour work week and a 10 percent increase in pay. Strikes in 1922, 1925, and 1931 were only marginally successful.

The period between 1918 and 1923 was marked by increased production in Lawrence's textile mills because of the post-war demand for worsted goods. A wartime construction ban was lifted in 1923, but the resulting expansion of textile mills did not concentrate along the Canal. Expansion consisted primarily of the construction of storehouses by the American Woolen Company after designs by Charles T. Main. Reinforced concrete and glass were the exterior materials of the flat-roofed, ten-story storehouse built by the American Woolen Company in 1919, the last large mill building to be constructed along the Canal (Map 29).

Through the 1920s, worsted woolen goods remained the leading industry, followed by cotton goods. The late twenties, however, were marked by the closing of the Atlantic Cotton Mills (1925-26) and the Everett Cotton Mills (1929). Southern competition--with its tax subsidies, lower-priced land, lack of labor laws, cheap, abundant labor, and proximity to some raw materials--was the primary cause. Some smaller firms, such as Lawrence Duck, however, remained in business until the mid-forties, and the wartime demand for military fabrics sustained a few manufacturers.

Paper manufacture continued as a flourishing business along the North Canal at the Russell-Champion International site. One of a half-dozen Lawrence firms to make paper-making machinery, an important subsidiary industry, was the Hamblet Machine Company on Island Street (Map 60).

1945-1982

The last major closing of a Lawrence textile concern was in 1957, when the Pacific mills closed. A post-war recession, declining population, competition from other markets, and deteriorating buildings were among the reasons for the final outcome of the once-flourishing textile industry in New England, in Lawrence, and along the North Canal. The aging buildings lacked trucking facilities, and the multi-story nature of the buildings was considered disadvantageous by potential new tenants. Many new uses, however, do exist. The replacement industries which currently use the mills are producers of electrical machinery, apparel and finished goods, machinery, textile mill products, and leather and leather products. Recently-arrived immigrant groups, including individuals from seventeen Latin American countries and Indochina, are among employees of the new industries. Some mill yards, particularly the Atlantic mill site, have been cleared of all buildings. Fire has ruined the Russell-Champion International Paper Mill site.

The North Canal is traversed daily by thousands of automobiles and trucks crossing the canal into or from central Lawrence, but the area is devoid of the intense activity which characterized it fifty years ago.

Historians' interest in the New England textile industry has made the North Canal an important focus of scholarly investigation. Many buildings have been surveyed by the Historic American Engineering Record and by the Lawrence Community Development Department. Company records are preserved at the Merrimack Valley Textile Museum. A State Heritage Park is planned for the Pacific and Atlantic mill sites near the dam on the upper island; the Bay State boarding house is to become a Park Visitor Center.

Bridges

Within the North Canal Historic District, fifteen bridges cross the North Canal and the Merrimack River. In addition to nine metal-truss bridges, there are three concrete or steel beam bridges, one stone arch, and one open-spandrel concrete arch.
The nine truss bridges present an unusual collection of truss types, including some of the earliest experiments in patented truss design, the Moseley and lenticular trusses. The collection also spans the transition between pin-connected and riveted construction--a change that for most companies in Massachusetts appeared in the late 1880s. The earliest of these bridges, the Upper Pacific Bridge (1864, Map 10) is the only known extant example of a Moseley truss in the United States, a form invented by the midwestern engineer T. H. W. Moseley. (Another example in Lawrence, Massachusetts, cited by HAER, has been replaced.) Another pin-connected truss from the period is the railroad bridge over the Merrimack, a six-span Pratt deck truss built by the Manchester & Lawrence Railroad in 1871. The form is virtually identical to the B & M's Eastern Division railroad bridge built over the Merrimack River at Newburyport in 1888. A remarkable contrast to the pin-connected railroad bridge is the Union, or Duck Bridge (Map 54), built in 1888 to the designs of well-known civil engineer George Leonard Vose (1831-1910). Of the many bridges constructed by the Boston Bridge Works, the five-span through Warren-truss design is one of the earliest to replaced pinned connections with riveted gusset plates and flanges. Also from the same period is an unusual hybrid pin-connected lenticular pony truss, probably the 85-foot span noted in the 1886 catalogue of the Berlin Iron Bridge Company.

Of the 20th-century bridges in the district, the most significant is the 1500-foot open-spandrel concrete arch Central Bridge built across the Merrimack in 1918 (Map 18). Designed by New York consulting engineer Benjamin H. Davis (1883-1927), the bridge is one of only eight open-spandrel examples known in the state, according to Massachusetts Historical Commission and Massachusetts Department of Public Works bridge records. At its opening, twenty-six lamp posts lined the parapet walls. "As a 'White Way,'" Maurice Dorgan write in 1918 (Lawrence Yesterday and Today), "The bridge is unsurpassed by anything of that nature to be seen in this locality." The parapet walls and lamp standards were removed in 1972.

Machinery

Among machinery still in place are two 39-inch vertical Hercules turbines (1891) and one 43-inch Leffel turbine which was installed in 1921 in the Pemberton Mill. At the Upper Pacific mill site, early turbines are housed in two stone wheelhouses dating from the 1850s. At the 1864 Lower Pacific Mill engine house (1885), three water turbines remain which were installed between 1914 and 1923. Three Hercules type-D vertical turines with umbrella generators were installed in the original wheelpits of the Lawrence Machine Shop in 1920. The Lawrence Machine Shop retains its original 125-foot granite-walled circular chimney; several chimneys are of note including the 250-foot brick chimney built by the Lockwood-Greene Company at the Washington Mills in 1886, then the second tallest chimney in new England.

An intact wooden rack housing for the Washington Mills is extant near Mill Street and the north Canal. (Map 28-1)

Archaeology

Despite often extensive disturbances, it is likely that the district contains significant archaeological potential. Among the issues which archaeological data can assist in documenting are: the physical evolution of the technological and industrial systems within the district; and the changing social and ethnic composition of the mill community. Archaeological potential should be considered greatest around those buildings, especially boarding houses, where minimal disturbances has occurred. Some potential for prehistoric archaeological sites also remains in spite of the radial altering of the landscape during the 19th century. One site has been recorded by the Massachusetts Historical Commission adjacent to the district.

Continuation Section 9 Major Bibliographical References

City Atlas of Lawrence, 1875, 1896, 1906, MVTM Collections

Continuation Section 8 Builder/Architect

Charles S. Storrow, James B. Francis, Chalres Bigelow, George L. Vose, George Moffette, Jr., Thomas H.W. Moseley, Benjamin H. Davis, Hiriam F. Mills, Charles T. Main, Phineas Stevens, Theodore Voelkers, Benjamin Coolidge, Lockwood-Greene Company (Engineers).

7. DESCRIPTION (technical amendment)

The approaches to the Casey Bridge (NR, 1984) along Amesbury Street, also known as the North and South Canal Bridges, were essentially built as extensions of the larger Casey Bridge over the Merrimack River. The open-spandrel concrete-arch Casey Bridge was completed in 1918; the two canal bridges were designed by the same consulting engineer, Benjamin H. Davis, are were built under separate contracts after the river bridge was completed. The original intent in building the Casey Bridge and its two approaches seems to have been to create a major north-south axis through downtown Lawrence, linking the commercial spine of Essex Street to a proposed union railroad station in South Lawrence.

The three bridges were each designed with 56' roadways and two 12' sidewalks, matching the dimensions of those on Essex Street.

The North Canal Bridge is a single-span, reinforced-concrete T-beam varient bridge. Abutments appear to be 1919 concrete down to at least the canal mudline.

(end)

The Commonwealth of Massachusetts

William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

August 11, 1998

Ms. Carol Shull
National Register of Historic Places
National Park Service
Department of the Interior
Mail Stop 2280, Suite 400
1849 C Street, NW
Washington, DC 20240

Dear Ms. Shull:

Please accept the enclosed technical amendment to the North Canal National Register District, Lawrence (Essex Co.), Massachusetts, originally listed November 13, 1984.

The district, as presently constituted, includes the Central Bridge over the Canal. The Massachusetts Historical Commission wishes to amend the district to include a separate approach bridge on Amesbury Street, identified by the Massachusetts Highway Department as bridge L-4-5. The bridge falls within the boundaries of the listed district, but was not included in the district documentation. A photograph of the bridge is enclosed. The bridge, erected in 1919, contributes to the district's significance. Enclosed is a National Register continuation sheet concerning the bridge and its historical significance.

Thank you for your attention in this matter.

Betsy Friedberg

Betsy Friedberg
National Register Director
Massachusetts Historical Commission

enclosure

cc: Lawrence Historical Commission
Steven Roper, Massachusetts Highway Department

220 Morrissey Boulevard, Boston, Massachusetts 02125 - (617) 727-8470
Fax: (617) 727-5128 TDD: 1-800-392-6090
Website: www.magnet.state.ma.us/sec/mhc

9. Major Bibliographical References

Dorgan, Maurice, Lawrence Yesterday and Today, 1918.
Dorgan, Maurice, History of Lawrence, MA. Cambridge: Murray Printing Co., 1924.
Molloy, Peter M. "Nineteenth Century Hydropower: Design and Construction of Lawrence Dam, 1845-1848." Winterthur Portfolio, Vol. 15, No. 4 Winter 1980, pp. 315-343
(Continued)

10. Geographical Data

Acreage of nominated property 60 acres

Quadrangle name Lawrence **Quadrangle scale** 1:25000

UTM References

	Zone	Easting	Northing
A	19	323750	4730600
B	19	324250	4730240
C	19	323620	4729900
D	19	323060	4729860
E	19	322560	4729500
F	19	322320	4730130
G			
H			

Verbal boundary description and justification This District includes all industrial structures, water power facilities, and residential/institutional structures associated with the North Canal and included within the boundaries indicated by a heavy red line on the map entitled, "North Canal Historic District" Scale 1"=720 feet.

List all states and counties for properties overlapping state or county boundaries

state	N/A	code	county	code
state		code	county	code

11. Form Prepared By

name/title Mari L. Myer, Program Assistant with Carole Zellie

organization Massachusetts Historical Commission **date** July, 1984

street & number 294 Washington Street **telephone** (617) 727-8470

city or town Boston **state** Massachusetts

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

X national X state X local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature Valerie A. Talmage

title State Historic Preservation Officer
Massachusetts Historical Commission **date** September 27, 1984

For NPS use only

I hereby certify that this property is included in the National Register

date

Keeper of the National Register

Attest: **date**

Chief of Registration

GPO 894-788

NORTH CANAL/DISTRICT DATA SHEET

Map#	NAME (designer-builder)	ADDRESS	OWNER/MAILING ADDRESS	DATE
1	NRHP North Canal (Charles Storrow)	along Canal Street	Essex Company, 6 Essex Street, Lawrence	1848
2	NRHP Great Stone Dam and Gatehouse (Charles Storrow)	Broadway at Canal St.	Essex Company, 6 Essex Street, Lawrence	1848
3	NRHP North Canal gatekeeper's house and barn and outbuildings	Broadway	Essex Company	1848
4	Upper Pacific Cotton Mill and Office	468 Canal Street	Ornsteen, Alan Al & RC Bass	ca.1890 (office 1887)
4-1	Pacific Cotton Mill-fragments (possible turbine houses)	468 Canal Street	Ornsteen, Alan Al & RC Bass	1852
5	Upper Pacific Storehouse #2 (Charles Bigelow?)	0 Broadway	Robert Goldstein 17 Bateson Drive Andover, MA 01810	ca. 1860
6*	Merrimack Valley United Fund	430 N. Canal Street	Merrimack Valley United Fund	1950s
7*	Merrimack Valley United Fund	430 N. Canal Street	Merrimack Valley United Fund	1950s
	No Information	444 Canal Street	Atlantic Enterprises	1950s
9	Atlantic-Middle Pacific Cotton Mill	400 Canal Street	Robert Goldstein 17 Bateson Drive Andover, MA 01810	ca. 1906
10	Upper Pacific Bridge between Hampshire and Franklin Streets (Moseley Truss)			1864
11	Upper Pacific Cotton Yarn Mill (#7) includes "Jerry's Broadway 5 Diner"	(144-23 Lot)	Assessor's Map 144 No Information	1902
12*	Garage- former Goodyear Store	? Broadway	Assessor's Map 144-22, Lot No Information	

*Intrusion

MAP #	NAME (designer-builder)	ADDRESS	OWNER	DATE
13	Upper Pacific Cotton Spinning Mill	Methuen Street	Map 144, 22 Lot	ca. 1888-89
14	Upper Pacific Worsted Mill	Methuen Street		ca. 1910
15	Upper Pacific Storehouse #6	2 Franklin Street		1896
16*	New England Telephone	433 Canal Street	New England Telephone/ 433 Canal St., Lawrence 185 Franklin St., Boston, MA 02107	
17	Atlantic Cotton Mills boarding house	401-403 Canal St.	Robert Gauthier, 320 Sutton St., North Andover, and Louis J. Goquen, 7 Mason Dr., Salem,NH 03079	ca. 1847
18	Central Bridge (Benjamin Davis, NYC)	foot of Amesbury St		1918
19	Lower Pacific Cotton Mill	300 Canal Street	B.A. Rowland/300 Canal St.	1883
19-1	Pacific Cotton Mill- fragment of well			1852-1880 (?)
20	Lower Pacific Worsted Mill (weaving)	300 Canal Street	B.A. Rowland/300 Canal St.	1864-1877-1908
21	Lower Pacific Engine House (Charles T. Main)	300 Canal Street	B.A. Rowland/300 Canal St.	1885
22	Lower Pacific Finishing Mill	300 Canal Street	B.A. Rowland/300 Canal St.	1911
23	Lower Pacific Finishing Mill	300 Canal Street	B.A. Rowland/300 Canal St.	1882
24	Lower Pacific Worsted Weaving Mill	361 Canal Street	JoGal Shoe Company J & B Realty Trust 5 Lawrence Street	1895
25	Lower Pacific Bridge (Pratt Truss-Phoenix Iron Works)	Appleton & Canal Sts.		1870-75

*Intrusion

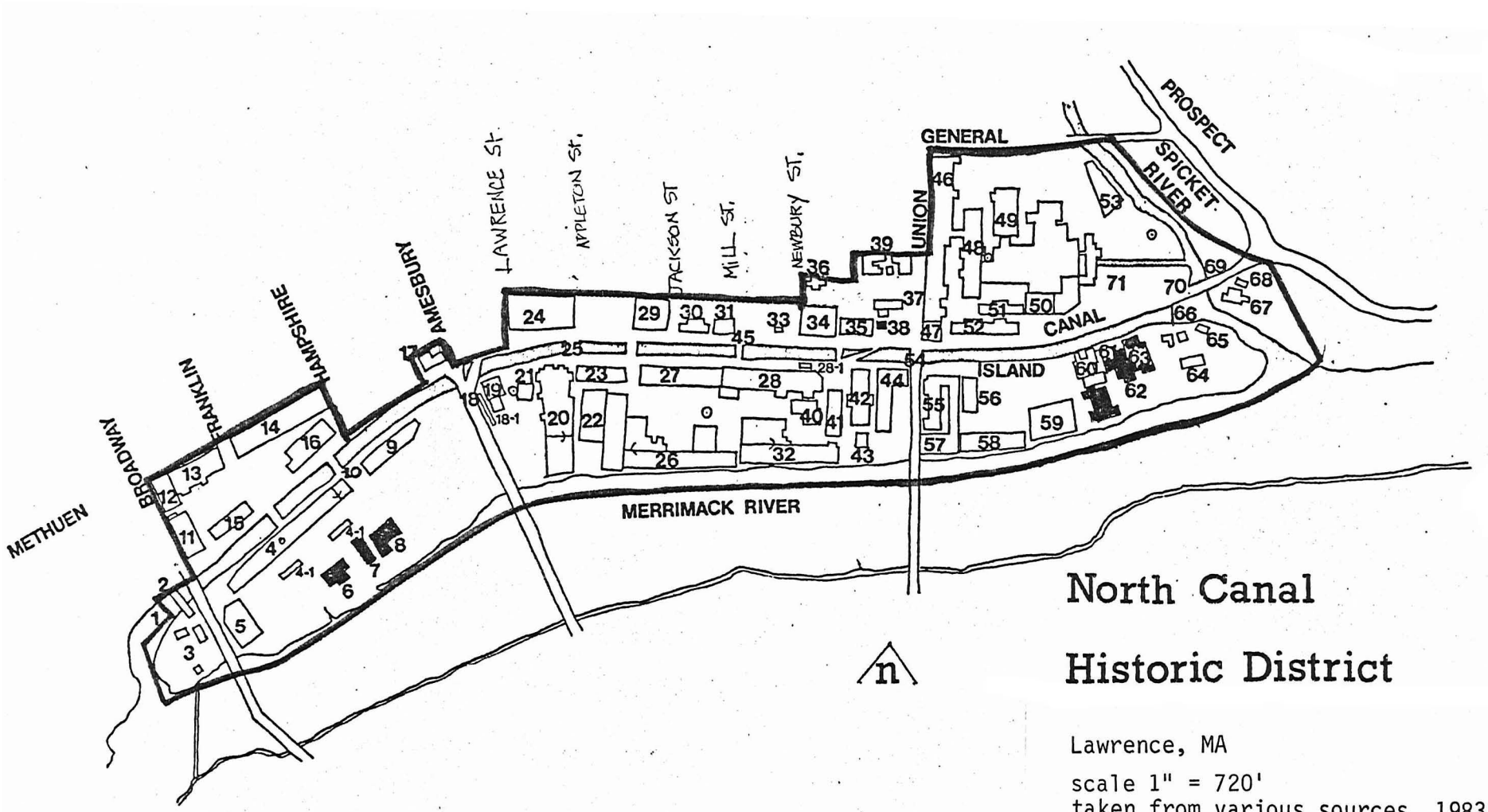
MAP #	NAME (designer-builder)	ADDRESS	OWNER	DATE
26	American Woolen Company (Lockwood-Greene)	Canal Street		1887 1886-87
27	Washington Mills (Lockwood-Greene)	250 Canal Street	Andrea Realty Trust	1886-87
28 28-1	American Woolen Co. Extension (Charles T. Main)	250 Canal Street	Robert Gauthier, 330 Sutton St. No. Andovewr	1909-25
29	American Woolen Co. Storehouse (Charles T. Main)	Jackson & Canal Streets	Vincent P. Morton, Inc., 93 Bridge St., Lowell 01852	1919
30	Bay State Woolen Mills Boarding house	1 Jackson Street	Angelo & Agatha Fisichella 175 Haverhill St.,Lawrence 01841	1847
31	American Woolen Office	1 Mill Street	Robert Gauthier, 330 Sutton St. No. Andover	1900
32	Washington Mill Co. "River Mill"	250 Canal street	Andrea Realty Trust, 250 Canal St.	1887
33	Pemberton Powerhouse			
34	American Woolen Co. Storehouse	2 Newbury St.	Freda Rozen, 214 Holt Rd. Andover 01810	1900 ca. 1890
35	Pemberton Co. Storehouse	246 Canal St.	Andrea Realty Trust 246 Canal St. (Harold Glassman: Trustee)	ca. 1890
36	Walton School	Methuen Street		ca. 1860
37	Pemberton Co. Stable	6 Methuen St.	Gaetano Pappalardo	ca. 1880
38*	Pemberton Stable addition	6 Methuen st.	7 Campo Seco St. Lawrence, MA	ca. 1960
39	NRHP Essex Co. Offices (Hiram Mills)	6 Essex St.	Essex Company (see above)	1886
40	American Woolen Co. Power Plant	250 Canal St.	Andrea Realty Trust (see above)	1923
41	Bay State Mills Railroad Shed	250 Canal Street	Andrea Realty Trust (see above)	1848

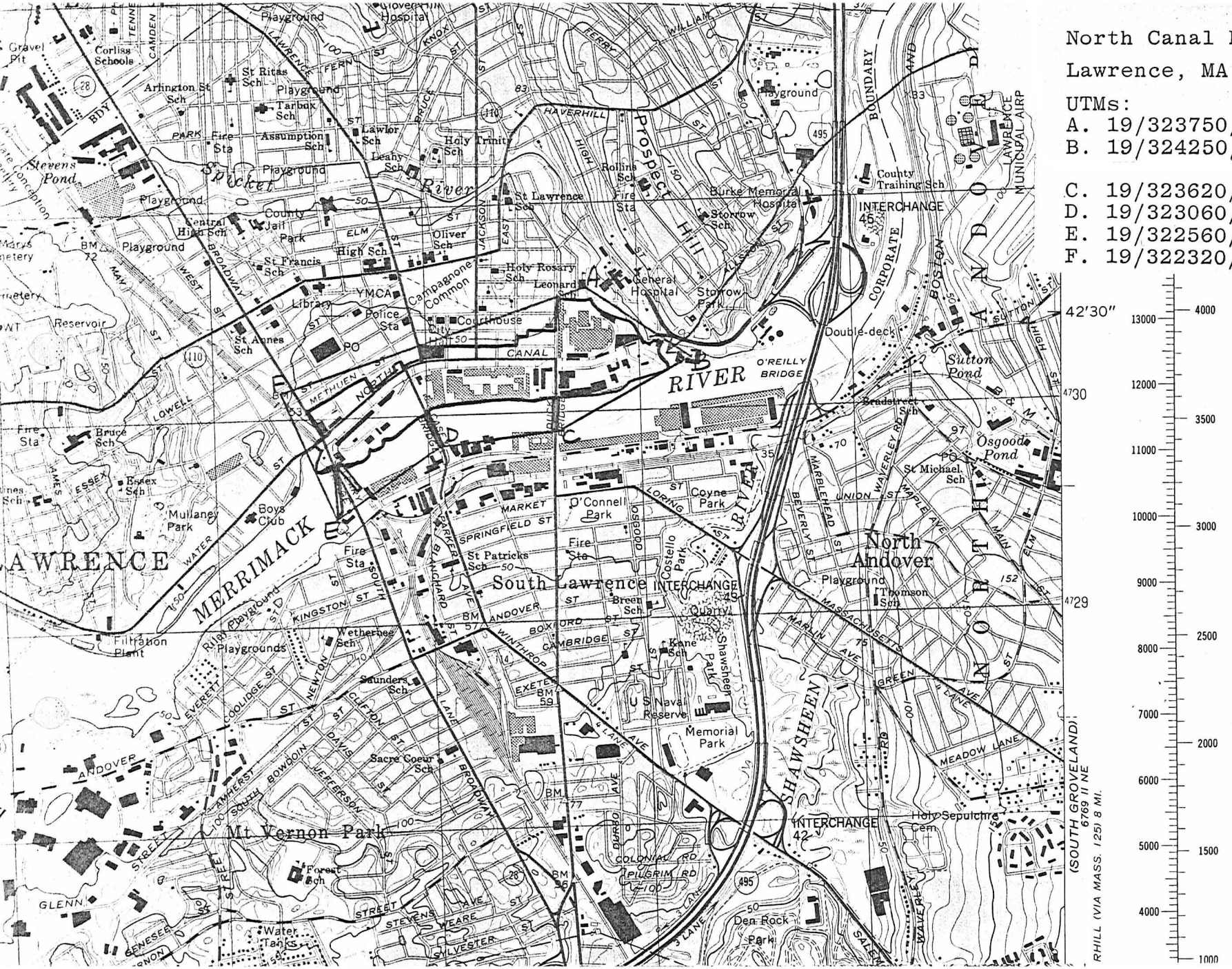
*Intrusion

MAP #	NAME (designer-builder)	ADDRESS	OWNER	DATE
42	Pemberton Mill (Theodore Voelkers)	216 Canal St.	Bernard Stainman 72 Sargeant Rd., Swampscott	1860-61
43	Powerhouse - Pemberton Mill			
44	Lawrence Duck Company Mill (original, Charles Bigelow; later, Charles T. Main)	4 Union Street	Joseph Ippolito, 4 Union St.	1853-1880-1906
45	Washington Mills Canal Bridge (Pratt Truss)	Jackson and Canal Streets		1886
46	Everett Mills (South end is Pemberton Warehouse)	15 Union Street	Everett Mill Properties	1909
47	Pemberton Warehouse			1900
48	NRHP Essex Company Machine Shop (Charles Bigelow)	70 General Street	Bolta Division, General Tire & Rubber, Akron, Ohio 44329	1846-48
49	Everett Mill Co. Mill #4	"	"	1892
50	Everett Mill Co. Picker House and Extension	"	"	
51	Everett Mill Co. Cloth Room	"	"	
52	Everett Mill Storehouse #6 (original cotton weaving house)	183 Canal Street	Grieco Bros., Inc. 183 Canal St., Lawrence, MA	1863-1946 (third floor)
53	Everett Mills Storehouse			1905
54	Union (Duck) Bridge (Warren Truss-George L. Vose-Boston Bridge Works)	Between Union and South Union Streets		
55	George Kuhnhardt Woolen Mill No. 1 and Office-Mill No. 2 connected by annex. #56 includes boiler house	Island Street	Island St. Realty Trust 50 R William St, Andover 01810	ca. 1890

MAP #	NAME (designer-builder)	ADDRESS	OWNER	DATE
56	George Kuhnhardt Woolen Shop	Island Street		ca.1896
57,58	George Kuhnhardt Woolen Mills	50 Island Street)	Island Street Realty Trust 50 R William St., Andover 01810	1896-1899
59	George Kuhnhardt Warehouse	50 Island Street)		
60	Webster-Dustin, later Hamblet Foundry	30 Island Street)		1859-1926
61*	Ferrous Technology	30 Island Street)	A & J Realty Trust P.O. Box 1106 Lawrence 01842	1960
62*	Ferrous Technology	30 Island Street)		1978
63*	Ferrous Technology	30 Island STreet)		1940
64	State Dept. of Public Health Experiment Station	Island Street	Greater Lawrence Sanitary no information	1886 (original 1950-52
65	North Canal Lockkeeper's house	Island Street	Essex Company 6 Essex St., Lawrence 01840	ca. 1848
66	Locks and wasteway			1845
67	Russell Paper Storehouse	1 Marston St.)	PEP Lawrence Inc. c/o Victor L. Hatem 307 Dorchester Ave. Boston, 02127	ca.1875
68	Russell Paper Storehouse	1 Marston St.)		ca.1853
69	Spicket Penstock (Charles Storrow)	Below Prospect St. Bridge	Essex Company) 6 Essex St. Lawrence 01840	ca.1855/rebuilt 1899/1913
70	Prospect Street Bridge (Charles Storrow)	Near Spicket wasteway	Essex Company)	ca.1855
71	Russell, later Champion International Paper Stie	21 Canal Street (at Spicket River)	Exec. Leasing & Rental c/o James Halloran 95 Lawrence Street Lawrence, MA 01840	1870 - in ruin

*Intrusion


METHUEN
BROADWAY
FRANKLIN
HAMPSHIRE
AMESBURY
LAWRENCE ST.
APPLETON ST.
JACKSON ST
MILL ST.
NEWBURY ST.
UNION
GENERAL
PROSPECT
SPICKET RIVER
CANAL
ISLAND
MERRIMACK RIVER
n
North Canal
Historic District
Lawrence, MA
scale 1" = 720'
taken from various sources, 1983
= Intrusions



North Canal Historic Dist.

Lawrence, MA

UTMs:

A. 19/323750/4730600
B. 19/324250/4730240

C. 19/323620/4729900
D. 19/323060/4729860
E. 19/322560/4729500
F. 19/322320/4730130

1. North Canal, east from Broadway. (Photograph: Carole Zellie, 1983)

2. Great Stone Dam, looking south from Broadway. (Photograph: Carole Zellie, 1983)

3. Gatekeeper's House (west elevation). (Photograph: Carole Zellie, 1983)

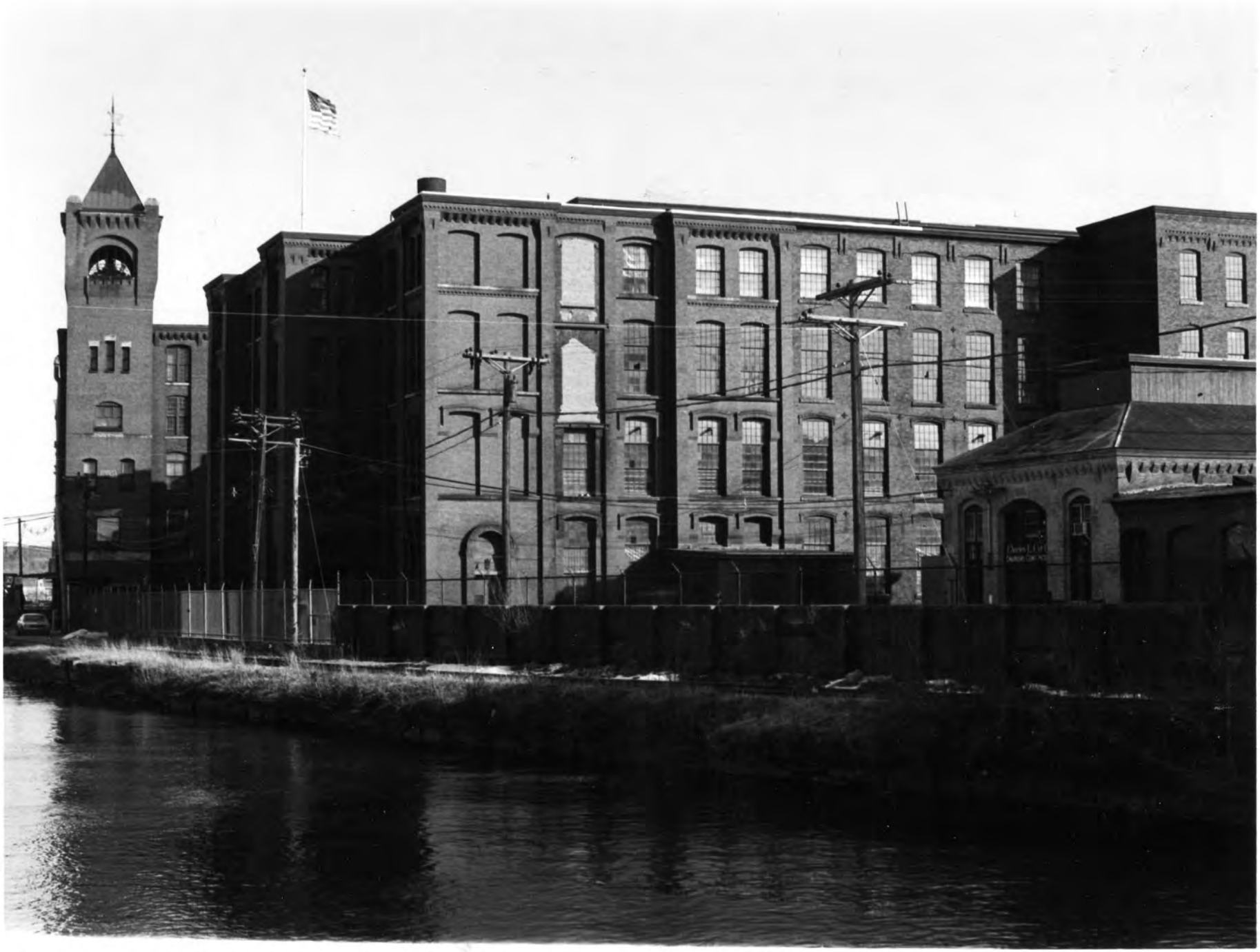
4. Pacific Mills Co.: #2 Storehouse. (Photograph: Carole Zellie, 1983)

5. Pacific Mills Cotton Yarn Mill (R) and Storehouse #6 (L). (Photograph: Carole Zellie, 1983)

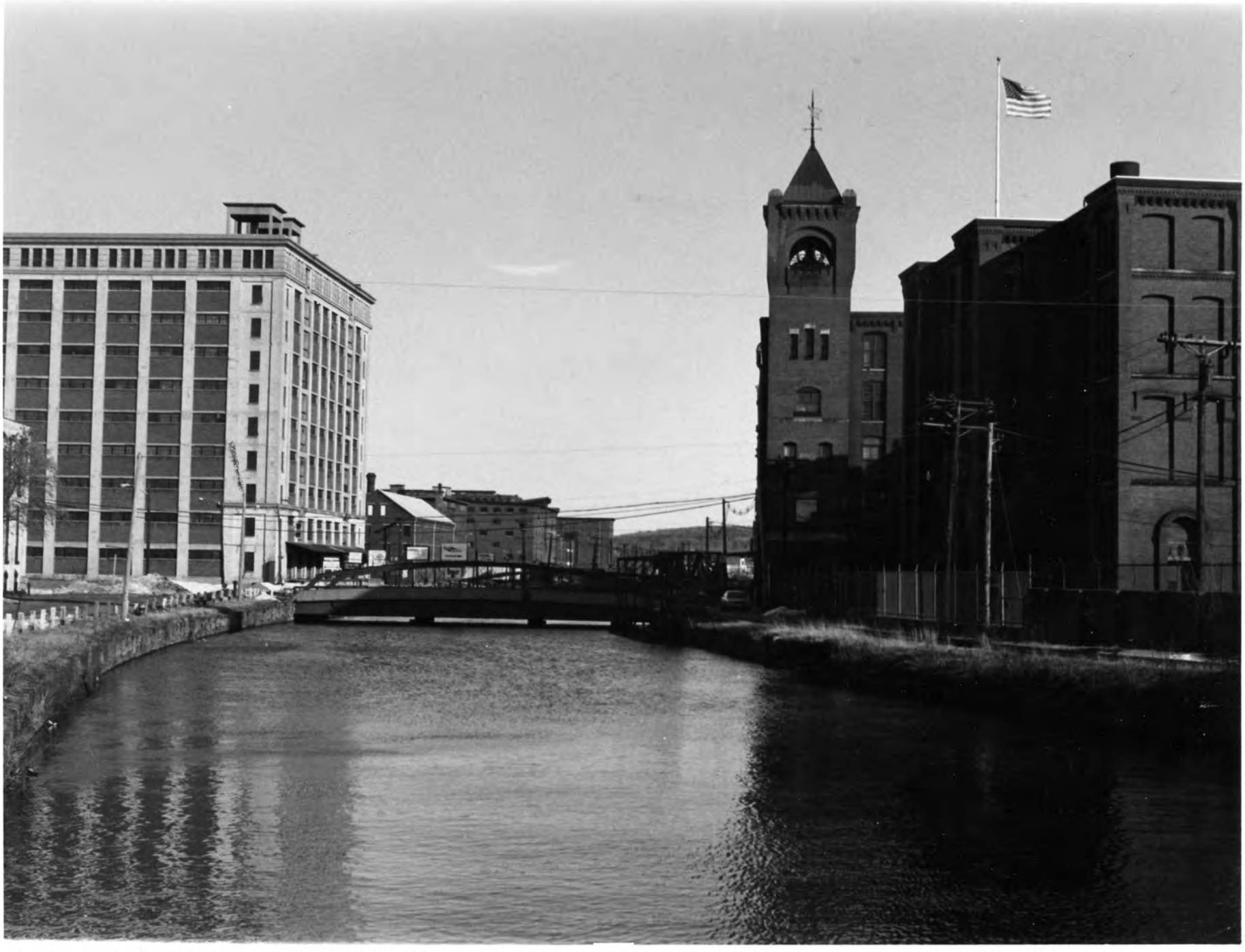
6. Atlantic Spinning Mill (northwest elevation). (Photograph: Carole Zellie, 1983)

7. Upper Pacific Bridge: Moseley Truss between Hampshire & Franklin streets. (Photograph: Carole Zellie, 1983)

8. Atlantic Cotton Mills Boarding House (southeast elevation). (Photograph: Carole Zellie, 1983)



9. Lower Pacific Mills (C); Engine House (R). (Photograph: Carole Zellie, 1983)



10. Lower Pacific Mills Finishing & Packing Mill (R); American Woolen Co. Storehouse #10 (L). (Photograph: Carole Zellie, 1983)

11. Washington Mill Co. Mills: 1886 Mill (foreground); 1905-25 Mill (rear). (Photograph: Carole Zellie, 1983)

12. Washington Mills Office, from Jackson Street. (Photograph: Carole Zellie, 1983)

13. Bay State Woolen Co. railroad shed, from Canal St. (Photograph: Carole Zellie, 1983)

14. Bay State Woolen Co. Boarding House. (Photograph: Carole Zellie, 1983)

15. Pemberton Manufacturing Co. (Photograph: Carole Zellie, 1983)

15A. Walton School (south elevaton). (Photograph: Carole Zellie, 1983)

16. Everett Cotton Mill. (Photograph: Carole Zellie, 1983)

17. Essex Company Machine Shop. (Photograph: Carole Zellie, 1983)

18. Everett Cotton Mill #6 Storehouse. (Photograph: Carole Zellie, 1983)

19. Kunhardt Woolen Mills Main Office & Main Mill Boiler House in foreground. (From Union St., looking north). (Photograph: Carole Zellie, 1983)

20. Essex Co, Lockkeeper's House (from Canal St., north elevation). (Photograph: Carole Zellie, 1983)

21. Russell Paper Co. storehouse. (Photograph: Carole Zellie, 1983)

22. Spicket Penstock; Russell / International Paper site in ruin (R). (Photograph: Carole Zellie, 1983)

Massachusetts Cultural Resource Information System
Scanned Record Cover Page

Inventory No:	LAW.908
Historic Name:	South Canal
Common Name:	
Address:	Merrimack St
	Parallel to Merrimack St
City/Town:	Lawrence
Village/Neighborhood:	Lawrence;
Local No:	
Year Constructed:	C 1866
Use(s):	
Significance:	Industry;
Area(s):	
Designation(s):	
Building Materials:	
Demolished	No

The Massachusetts Historical Commission (MHC) has converted this paper record to digital format as part of ongoing projects to scan records of the Inventory of Historic Assets of the Commonwealth and National Register of Historic Places nominations for Massachusetts. Efforts are ongoing and not all inventory or National Register records related to this resource may be available in digital format at this time.

The MACRIS database and scanned files are highly dynamic; new information is added daily and both database records and related scanned files may be updated as new information is incorporated into MHC files. Users should note that there may be a considerable lag time between the receipt of new or updated records by MHC and the appearance of related information in MACRIS. Users should also note that not all source materials for the MACRIS database are made available as scanned images. Users may consult the records, files and maps available in MHC's public research area at its offices at the State Archives Building, 220 Morrissey Boulevard, Boston, open M-F, 9-5.

Users of this digital material acknowledge that they have read and understood the MACRIS Information and Disclaimer (http://mhc-macris.net/macrisdisclaimer.htm)

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

LAW.908

HAER INVENTORY

1. NAME OF STRUCTURE: The South Canal
2. DATE: 1866-1906
3. NATURE OF STRUCTURE: Power Canal
4. INDUSTRIAL CLASSIFICATION: 812
5. LOCATION: STREET & NUMBER: Parallel to Merrimack Street
CITY OR TOWN: Lawrence
COUNTY: Essex
STATE: MA
6. USGS QUAD MAP & UTM GRID REF.: Lawrence 19.310260. 472222
7. OWNER OF PROPERTY: Essex Company, Lawrence, MA
ADDRESS:
8. CONDITION: [X] EXCELLENT [ ] GOOD [ ] FAIR [ ] DETERIORATED [ ] RUINS [ ] UNEXPOSED [ ] ALTERED [X] ACCESSIBLE TO PUBLIC

9. DESCRIPTION & BACKGROUND HISTORY: NUMBER OF STRUCTURES; DIMENSIONS; FABRIC; STRUCTURE & FORM; SURVIVING MACHINERY, FITTINGS AND EQUIPMENT; APPROX. AREA OF SITE; ALTERATIONS; PRESENT USE; ENGINEER/ ARCHITECT/DESIGNER; IMPORTANT EVENTS & INDIVIDUALS.

The South Canal was intended to provide water power for industries in South Lawrence. The canal was constructed in six stages from 1866 to 1906 from the south side of the Great Stone Dam to its terminus at the Ayer Mill. The first 2,000 feet from the Great Stone Dam to 500 feet west of Parker Street was completed in 1867. The canal was extended an additional 750 feet in 1896 to provide water power for a hydro-electric plant. During the years 1906 to 1910 underground pipes were constructed from the eastern end of the canal to the Ayer and Wood Mills, to provide boiler feed and process water. The canal is rectangular in section, 10 feet deep, and narrows from 60 feet wide at the dam to 15 feet wide at its eastern extremity. It is three fourths of a mile in length.

10. PHOTOGRAPHS & SKETCH MAP ON REVERSE SIDE.

11. RELATED SOURCES OF INFORMATION: HISTORICAL REFERENCES (PUBLISHED ARTICLES, MANUSCRIPTS, REPORTS, DRAWINGS, PHOTOGRAPHIC RECORDS)
CONTACTS: (NAMES & ADDRESSES OF ANYONE WITH EYE-WITNESS ACCOUNTS OR RELEVANT INFORMATION); TAPE RECORDINGS.

Census of 1880, Vol. XVI
Records of the Essex Co., MVTM

12. DANGER OF DEMOLITION OR DAMAGE [ ] YES [X] NO
NATURE OF THREAT:

13. PRIORITY: 3

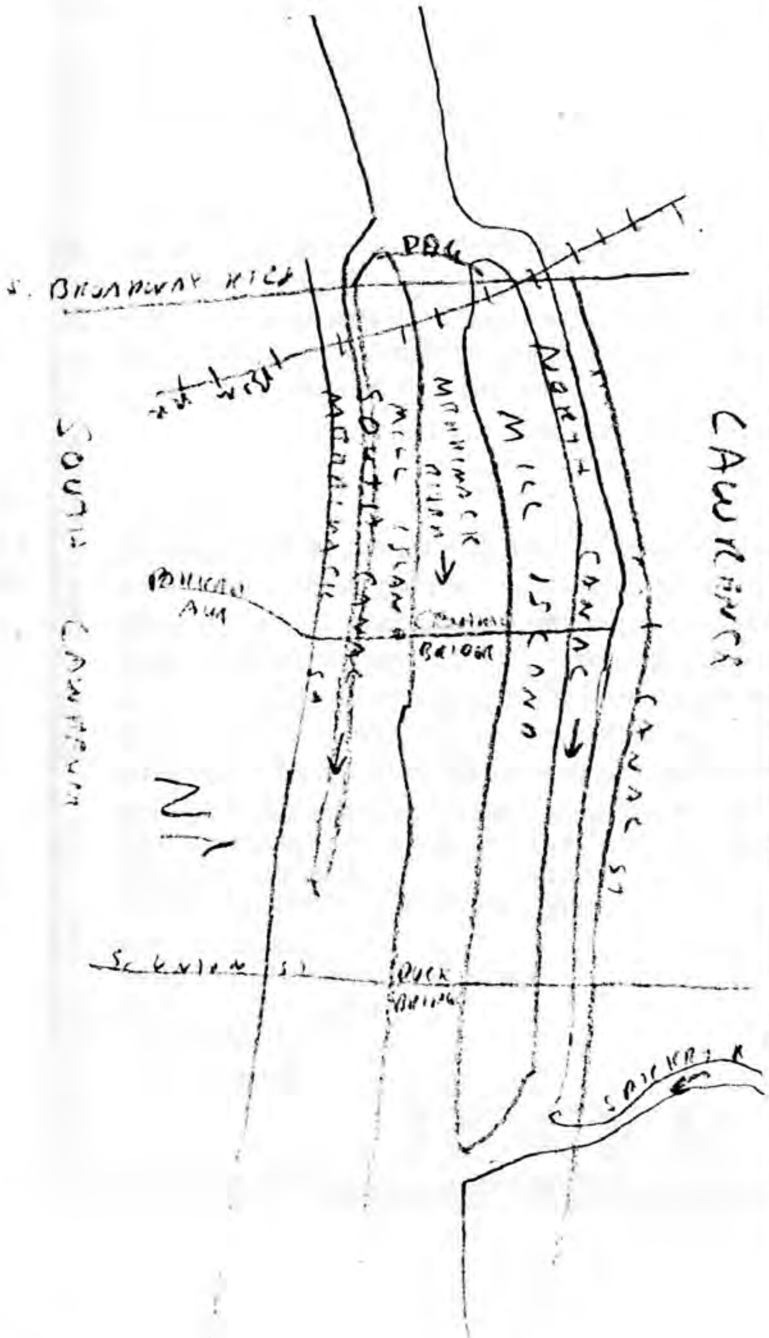
14. EXISTING SURVEYS AND DATES: [ ] NHL [ ] NR [ ] HAER [ ] HABS [ ] STATE [ ] COUNTY [ ] LOCAL [ ] OTHER

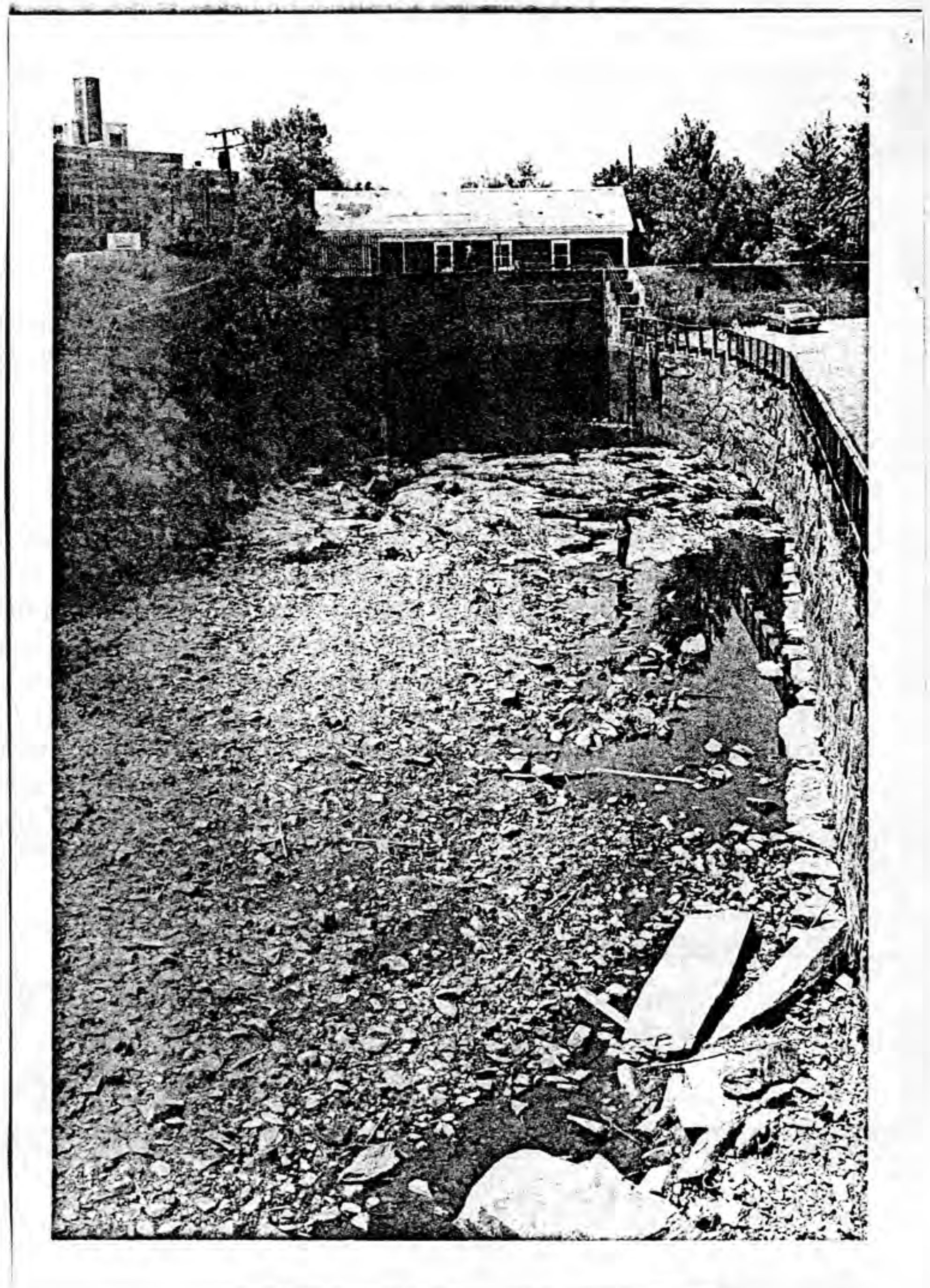
15. INVENTORIED BY: YOUR NAME | ADDRESS | AFFILIATION | DATE
Peter M. Molloy & Marion J. Hyde, 800 Mass. Ave., N. Andover, MA - Merrimack Valley Textile Museum 6/76

PLEASE RETURN TO THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, WASHINGTON, DC 20240

P30618X

LAW.908


NORTH CANAL
MILL ISLAND
SOUTH CANAL
LAWRENCE
SOUTH LAWRENCE
CANAL ST



Appendix B – Copies of Correspondence

HDR

CONCURRENCE Brona Simon PC. 14254
11/4/24 BRONA SIMON
STATE HISTORIC
PRESERVATION OFFICER
MASSACHUSETTS
HISTORICAL COMMISSION

September 24, 2024

Brona Simon
Massachusetts Historical Commission
State Historic Preservation Officer 220
William T Morrissey Blvd
Boston, Massachusetts 02125

Subject: **Second Request Concurrence on the Area of Potential Effects under Section 106 of the NHPA for the Lawrence Hydroelectric Project, FERC Project Number 2800; Essex County, Massachusetts.**

Dear Brona Simon:

Essex Company, LLC (Essex), a subsidiary of Patriot Hydro, LLC, is the Licensee, owner, and operator of the Lawrence Hydroelectric Project (FERC No. 2800) (Project or Lawrence Project). The Project was licensed by the Federal Energy Regulatory Commission (FERC or Commission) on December 4, 1978 (with an effective date of December 1, 1978), and the license expires on November 30, 2028. The Lawrence Project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts. Essex has initiated a licensing process for the Project with the Federal Energy Regulatory Commission (FERC). The licensing of the Lawrence Hydroelectric Project requires FERC to comply with relevant federal historic preservation laws. Specifically, Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 300101 et seq.), requires federal agencies to consider the effects of their undertakings on historic properties.[1]

On August 15, 2023, FERC issued a Notice of Intent (NOI) to File License Application for a New License and Commencing Pre-filing Process, which designated Essex as the non-federal representative in accordance with Title 36 Code of Federal Regulations (CFR) Section 800.2(c)(4) for carrying out consultation with the State Historic Preservation Office (SHPO) under Section 106 of NHPA. HDR Engineering, Inc. (HDR) has been retained by Essex in support of performing the Historically Significant Waterpower Equipment Study and Condition Assessment of Historic Properties and Associated Canal System Study (Studies).

On July 16, 2024, HDR sent letters by mail initiating consultation with SHPO (per 36 CFR Section 800.3) and requesting concurrence on the appropriateness of Area of Potential Effect (APE) in accordance with 36 CFR 800.4(a)(1). Essex is proposing the FERC Project Boundary as the APE. Essex is seeking concurrence from SHPO on the APEs for the Studies.

---

[1] "Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP] maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR Section 800.16(l)(1)

Additionally, Essex is notifying you that the field assessments for the Studies are scheduled to be initiated during the week of **October 21, 2024**. If the SHPO would like to attend the field assessments, please notify Kelsey Iffert at the contact information below.

If you have any questions or require additional information regarding any other aspect of this letter, please do not hesitate to contact me at (315) 414-2206 or Kelsey.iffert@hdrinc.com. HDR and Essex appreciate your participation in the Studies.

Thank you for your assistance with this request.

Sincerely,

Kelsey Iffert

Kelsey Iffert, MS
Environmental/Regulatory Section Lead
HDR

Iffert, Kelsey

From: Iffert, Kelsey
Sent: Tuesday, September 24, 2024 10:46 AM
To: Jonas Stundzia; David Meehan (dmeehan@cityoflawrence.com); Daniel McCarthy; Susan Grabski (director@lawrencehistory.org)
Cc: Kevin Webb; Skip Medford; Keen, Ann; Barnes, Jeanne
Subject: RE: Studies for Lawrence Hydroelectric Project - Request for consultation and concurrence on the APE
Attachments: 20240924 Lawrence LHC Consultation.pdf

Good morning,

Essex is requesting concurrence or feedback from the Lawrence Historical Commission (LHC) on the proposed Area of Potential Effect (APE) for the two studies to be performed at the Lawrence Hydroelectric Project this fall.

Essex made the initial request by email and hardcopy mail on July 23, 2024. Essex also reached out to the Massachusetts Historical Commission State Historic Preservation Officer (SHPO) requesting concurrence on the APE. This morning, Essex sent the attached letter by hardcopy mail to LHC and sent a letter to SHPO as well.

Essex scheduled the field effort associated with the two studies for the week of October 21, 2024. If LHC would like to attend the field assessments, please let us know. The SHPO has been invited to attend.

Kelsey Iffert, MS
Environmental/Regulatory Section Lead

HDR
231 Salina Meadows Parkway, Suite 210
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.iffert@hdrinc.com
hdrinc.com/follow-us

From: Iffert, Kelsey
Sent: Monday, August 12, 2024 11:43 AM
To: Jonas Stundzia <jonasstundzia@hotmail.com>; David Meehan (dmeehan@cityoflawrence.com) <dmeehan@cityoflawrence.com>; Daniel McCarthy <dmccarthy@cityoflawrence.com>; Susan Grabski (director@lawrencehistory.org) <director@lawrencehistory.org>
Cc: Kevin Webb <kwebb@patriothydro.com>; Skip Med□ord <smed□ord@patriothydro.com>; Keen, Ann <ann.keen@hdrinc.com>
Subject: RE: Studies □or Lawrence Hydroelectric Project - Request □or consultation and concurrence on the APE

Good morning –

Essex is requesting concurrence or □eedback on the proposed APE □or the two studies to be per□ormed at the Lawrence Project this □all. As per the LHC's recommendation, we are also requesting inclusion on the agenda □or an in-person, public meeting with LHC at the next opportunity, ideally September 9, in advance o□fieldwork to be per□ormed this □all.

Thank you very much. Please □eel □ree to contact us at any time with questions or □or □urther in□ormation —

Kelsey Iffert

Kelsey Iffert, MS
HDR
231 Salina Meadows Parkway, Suite 210
Syracuse, NY 13212
315.706.5176

From: Iffert, Kelsey
Sent: Tuesday, July 23, 2024 9:33 AM
To: Jonas Stundzia <jonasstundzia@hotmail.com>; David Meehan (dmeehan@cityoflawrence.com) <dmeehan@cityoflawrence.com>; Daniel McCarthy <dmccarthy@cityoflawrence.com>; Susan Grabski (director@lawrencehistory.org) <director@lawrencehistory.org>
Cc: Kevin Webb <kwebb@patriothydro.com>; Skip Med□ord <smed□ord@patriothydro.com>; Smith, Kimberly <Kimberly.Smith@hdrinc.com>
Subject: Studies □or Lawrence Hydroelectric Project - Request □or consultation and concurrence on the APE

Dear Addressee –

Essex Company, LLC (Essex), owner and operator o□the Lawrence Hydroelectric Project, is per□orming the Condition Assessment o□Historic Properties and Associated Canal System Study and the Historically Significant Waterpower Equipment Study in support o□obtaining a new license □rom the Federal Energy Regulatory Commission. Essex is proposing the existing Project Boundary as the area o□potential effect (APE) □or both studies, which incorporates the Great Stone Dam, the Project impoundment, intake canal, powerhouse, turbines and generators, the North Canal and the South Canal and their respective gatehouses.

On July 16, 2024 Essex mailed the attached letters to the Lawrence Historical Commission initiating consultation and requesting concurrence on the APE. Essex concurrently mailed letters to the Massachusetts Historical Commission requesting their concurrence on the APE within 30 days under Section 106 o□the National Historic Preservation Act.

As per the LHC's recommendation, with this email we are also requesting inclusion on the agenda for an in-person, public meeting with LHC at the next opportunity to discuss the APE for the studies, as well as to review study goals and objectives.

Thank you again for working with us and all stakeholders in Lawrence. Please feel free to contact us at any time with questions or for further information—

Kelsey Iffert, MS
HDR
231 Salina Meadows Parkway, Suite 210
Syracuse, NY 13212
315.706.5176

Iffert, Kelsey

From: Iffert, Kelsey
Sent: Wednesday, September 25, 2024 9:25 AM
To: Brad Buschur
Subject: RE: Studies for Lawrence Hydroelectric Project - Request for consultation and concurrence on the APE

Will do Brad, thanks.

Kelsey Iffert, MS
D 315.414.2206 **M** 315.706.5176
kelsey.iffert@hdrinc.com
hdrinc.com/follow-us

From: Brad Buschur <bbuschur@groundworklawrence.org>
Sent: Tuesday, September 24, 2024 5:21 PM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Subject: FW: Studies for Lawrence Hydroelectric Project - Request for consultation and concurrence on the APE

Hi Kelsey,

Can Essex please include GWL on invites related to SHPO related items?

Thanks, Brad

From: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Sent: Tuesday, September 24, 2024 10:46 AM
To: Jonas Stundzia <jonasstundzia@hotmail.com>; David Meehan (dmeehan@cityoflawrence.com) <dmeehan@cityoflawrence.com>; Daniel McCarthy <dmccarthy@cityoflawrence.com>; Susan Grabski <director@lawrencehistory.org>
Cc: Kevin Webb <kwebb@patriothydro.com>; Skip Medford <smedford@patriothydro.com>; Keen, Ann <ann.keen@hdrinc.com>; Barnes, Jeanne <jeanne.barnes@hdrinc.com>
Subject: RE: Studies for Lawrence Hydroelectric Project - Request for consultation and concurrence on the APE

Iffert, Kelsey

From: Iffert, Kelsey
Sent: Friday, November 1, 2024 4:07 PM
To: Daniel McCarthy; Jonas Stundzia; David Meehan; Susan Grabski (director@lawrencehistory.org)
Cc: Kevin Webb; Skip Medford; Barnes, Jeanne; Carlini, Molly
Subject: RE: Studies for Lawrence Hydroelectric Project - Request for consultation and concurrence on the APE

Hi Dan – thanks for reaching out. The field components for the Historically Significant Waterpower Equipment Study and the Condition Assessment of Historic Properties and Associated Canal System Study were completed last week.

As per the relicensing schedule established by the Federal Energy Regulatory Commission (FERC), the initial study reports will be filed with FERC by April 26, 2025 and also made available at that time for public review and comment. The public relicensing website (here) launched by Essex hosts resources, including key documents and the schedule published by FERC.

Essex will hold a public meeting in Lawrence (called the "Initial Study Report Meeting") to review the results of the studies in May 2025 with interested parties and FERC.

FERC will formally accept comments on the study reports until June 25, 2025.

I confirmed that you and others cc'd are on our distribution list, so you will continue to be notified of these milestones and dates.

Let me know if you have any questions and have a great weekend.
Kelsey

Kelsey Iffert, MS
D 315.414.2206 **M** 315.706.5176

From: Daniel McCarthy <DMcCarthy@CITYOFLAWRENCE.COM>
Sent: Monday, October 28, 2024 1:41 PM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>; Jonas Stundzia <jonasstundzia@hotmail.com>; David Meehan <DMeehan@CITYOFLAWRENCE.COM>; Susan Grabski (director@lawrencehistory.org) <director@lawrencehistory.org>
Cc: Kevin Webb <kwebb@patriothydro.com>; Skip Medford <smedford@patriothydro.com>; Keen, Ann <ann.keen@hdrinc.com>; Barnes, Jeanne <jeanne.barnes@hdrinc.com>
Subject: Re: Studies for Lawrence Hydroelectric Project - Request for consultation and concurrence on the APE

Kelsey

Could you provide us a calendar of events so that the commission can follow and review for comment.

Thank you.

Dan

Daniel A. McCarthy

Acting Planning Director/ Conservation Agent

City of Lawrence

Office of Planning & Development

360 Merrimack Street

Entrance K Suite 270

Lawrence, MA 01843

Ph: (978) 620-3505

dmccarthy@cityoflawrence.com

July 16, 2024

Jonas Stundžia
Chairman
Lawrence Historical Commission
200 Common Street
3rd Floor
Lawrence, MA 01840

Subject: **Initiating Consultation and Requesting Concurrence on the Area of Potential Effects for the Lawrence Hydroelectric Project, FERC Project Number 2800; Essex County, Massachusetts.**

Dear Jonas Stundžia:

Essex Company, LLC (Essex), a subsidiary of Patriot Hydro, LLC, is the Licensee, owner, and operator of the Lawrence Hydroelectric Project (FERC No. 2800) (Project or Lawrence Project). The Project was licensed by the Federal Energy Regulatory Commission (FERC or Commission) on December 4, 1978 (with an effective date of December 1, 1978), and the license expires on November 30, 2028. The Lawrence Project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts. Essex has initiated a licensing process for the Project with the Federal Energy Regulatory Commission (FERC). The issuance of a license by FERC to Essex is a federal undertaking subject to compliance with relevant federal historic preservation laws. In particular, as the lead federal agency for the undertaking, FERC must comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 300101 et seq.), which requires federal agencies to take into account the effects of their undertakings on historic properties.[1]

FERC issued a Notice of Notice of Intent (NOI) to File License Application and Filing of Pre-Application Document on August 15, 2023. This issuance designated Essex as the non-federal representative in accordance with Title 36 Code of Federal Regulations (CFR) Section 800.2(c)(4) for purposes of consultation under Section 106 of the NHPA (see Attachment 2).[2] On behalf of Essex under the authority of the FERC, HDR Engineering, Inc. (HDR) initiated consultation with the Massachusetts State Historic Preservation Officer (SHPO) per 36 CFR Section 800.3 for the Project and in accordance with 36 CFR

[1] "Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP] maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR Section 800.16(l)(1).
[2] FERC issued the Notice of Notice of Intent to File License Application and Filing of Pre-Application Document on August 15, 2023.

800.4(a)(1), requested concurrence on the appropriateness of the area of potential effects (APE) for the proposed undertaking. Additionally, Essex is seeking your concurrence with with the APE for the proposed undertaking.

Project Description

The Lawrence Hydroelectric Project is located along the Merrimack River in Lawrence, Massachusetts, and the Project consists of facilities including the Essex Dam, or the Great Stone Dam, the Project impoundment, intake canal, powerhouse, turbines and generators, the North Canal the South Canal and their respective gatehouses, tailrace, fish passage structures, transmission line, and recreational facilities. The Project is the first dam on the Merrimack River, approximately 29 river miles (RM) from the Atlantic Ocean and is located approximately 11 RM downstream of the Lowell Hydroelectric Project (FERC No. 2790).

FERC regulations require that a licensed hydroelectric project include a defined Project Boundary that includes "only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources." The Project Boundary encompasses approximately 1,092 acres.

Area of Potential Effects Description

Project operation and maintenance has the potential to affect historic properties. As defined in the applicable regulations found at 36 CFR 800.16(d), the APE is "...the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist." Because the Project Boundary encompasses all lands that are necessary for Project purposes, all Project-related operations, potential enhancement measures, and routine maintenance activities associated with the implementation of a license issued by the Commission are expected to take place within the Project Boundary. The proposed APE is consistent with the potential scope of Project effects and the manner in which the Commission has defined the APEs for other hydroelectric relicensings.

During the licensing process, Essex will conduct a Historically Significant Waterpower Equipment Study in accordance with the *Historically Significant Waterpower Equipment Study Plan, Lawrence Hydroelectric Project (FERC No. 2800)* (Revised Study Plan), dated April 10, 2024.

Because it is not possible to determine all of the effects of various activities that may occur over the course of a license, Essex plans to develop a Historic Properties Management Plan (HPMP) in consultation with consulting parties to manage potential effects on historic properties throughout the term of a license issued by FERC. FERC typically completes

Section 106 by entering into a Programmatic Agreement (PA) or Memorandum of Agreement (MOA) with the licensee, the Advisory Council on Historic Preservation (ACHP), if they choose to participate, and the SHPO that requires the licensee to develop and implement an HPMP in consultation with Section 106 consulting parties.

Essex will prepare a report at the conclusion of the Historically Significant Waterpower Equipment Study that will contain sensitive, confidential, and privileged information and will work with FERC, SHPO, and tribes to ensure that confidential information is shared with consulting parties appropriately. Essex will seek SHPO concurrence on any NRHP eligibility determinations. The study report may be filed with FERC with a designation as "privileged." Essex will also provide a summary of findings for purposes of the public licensing process that excludes sensitive, confidential, and privileged information.

Essex requests your concurrence on the appropriateness of the APE for the proposed undertaking. We look forward to receiving your response within 30 days of your receipt of this submittal given field work associated with the Historically Significant Waterpower Equipment Study is scheduled to begin in this fall of 2024 (mid-September to October).

If you have any questions or require additional information regarding the attachments or any other aspect of this transmittal, please do not hesitate to contact me at (717) 515-8994 or Kimberly.smith@hdrinc.com. Thank you for your assistance with this undertaking.

Respectfully submitted,

Kimberly M. Smith

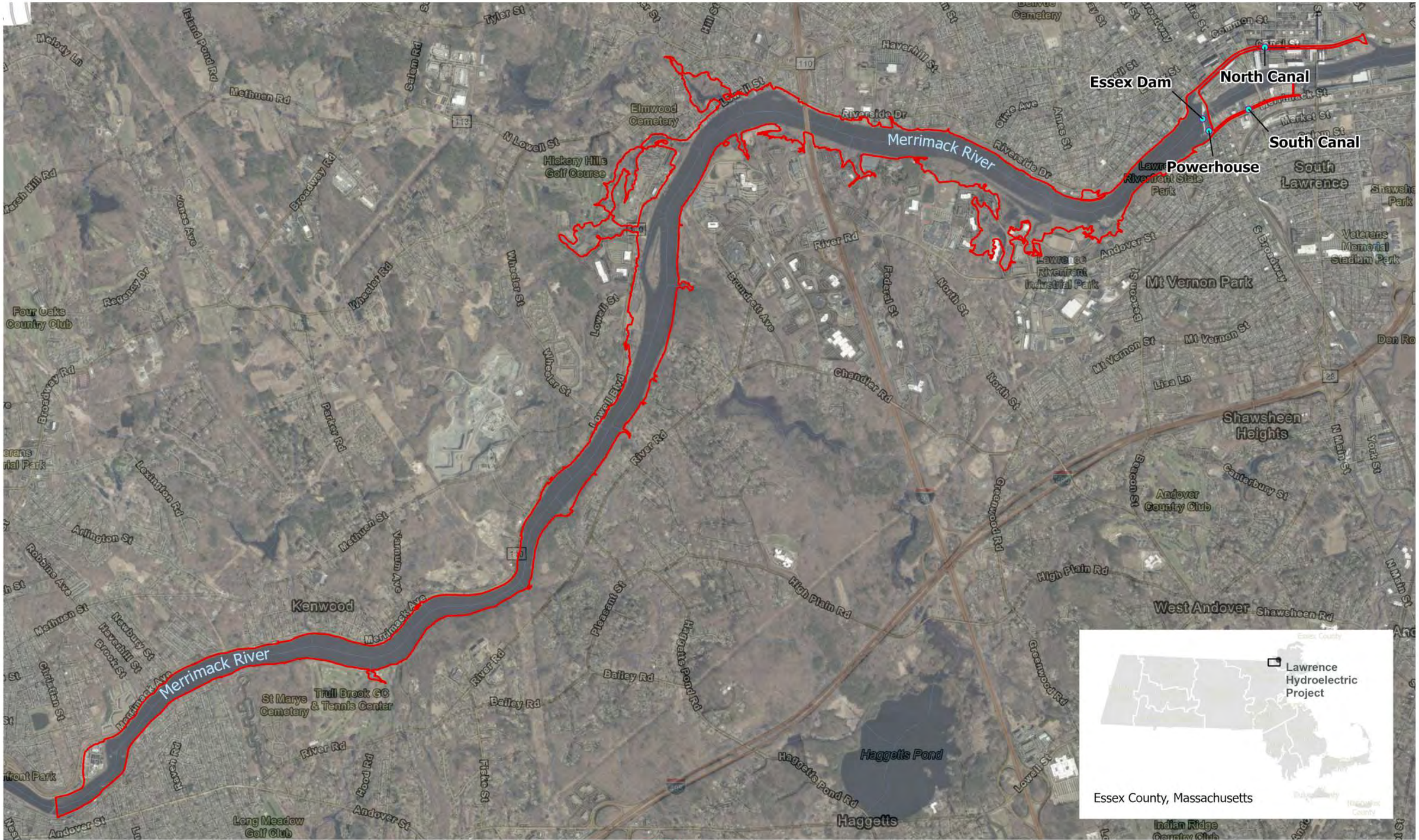
Kimberly Smith, MA, RPA
Senior Cultural Resources Specialist
HDR

cc:

Attachments: 1) Project Boundary Map
2) FERC Notice of Intent to File License Application, Filing of Pre-Application Document

Attachment 1

Project Boundary Map



AREA OF INTEREST
ESSEX DAM AND FACILITIES

\\SYR-SRV01\GIS\PROJECTS\CENTRAL_RIVERS_POWER\10358652_LAWRENCERELICENSING\7.2_WIP\MAP_DOCS\CRP_LAWRENCEPROJECT1.APRX DATE: 6/14/2023

LAWRENCE HYDROELECTRIC PROJECT

PROJECT FACILITIES
ESSEX COUNTY, MASSACHUSETTS

\\SYR-SRV01\GIS\PROJECTS\CENTRAL_RIVERS_POWER\10358652_LAWRENCERELICENSING\7.2_WIP\MAP_DOCS\CRP_LAWRENCEPROJECT1.APRX DATE: 6/14/2023

LAWRENCE HYDROELECTRIC PROJECT

Initiating Consultation and Requesting Concurrence on the APE for the Lawrence Hydroelectric Project, FERC Project Number 2800; Essex County, Massachusetts.

Attachment 2

FERC NOI and designation of Essex as non-federal representative for purposes of Section 106 consultation during licensing

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Essex Company, LLC Project No. 2800-054

NOTICE OF INTENT TO FILE LICENSE APPLICATION, FILING OF PRE-APPLICATION DOCUMENT (PAD), COMMENCEMENT OF PRE-FILING PROCESS, AND SCOPING; REQUEST FOR COMMENTS ON THE PAD AND SCOPING DOCUMENT, AND IDENTIFICATION OF ISSUES AND ASSOCIATED STUDY REQUESTS

(August 15, 2023)

a. Type of Filing: Notice of Intent to File License Application for a New License and Commencing Pre-filing Process

b. Project No.: 2800-054

c. Dated Filed: June 16, 2023

d. Submitted By: Essex Company, LLC (Essex)

e. Name of Project: Lawrence Hydroelectric Project (Lawrence Project)

f. Location: The project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts.

g. Filed Pursuant to: 18 C.F.R. Part 5 of the Commission's Regulations

h. Applicant Contact: Kevin Webb, Hydro Licensing Manager, Essex Company, 670 N. Commercial Street, Suite 204, Manchester, NH 03101; (978) 935-6039; kwebb@patriothydro.com.

i. FERC Contact: Bill Connelly at (202) 502-8587 or e-mail at william.connelly@ferc.gov.

j. Cooperating agencies: Federal, state, local, and tribal agencies with jurisdiction and/or special expertise with respect to environmental issues that wish to cooperate in the preparation of the environmental document should follow the instructions for filing such requests described in item o below. Cooperating agencies should note the Commission's policy that agencies that cooperate in the preparation of the environmental document cannot also intervene. *See* 94 FERC ¶ 61,076 (2001).

k. With this notice, we are initiating informal consultation with: (a) the U.S. Fish and Wildlife Service and/or the National Oceanic and Atmospheric Administration Fisheries under section 7 of the Endangered Species Act and the joint agency regulations thereunder at 50 C.F.R., Part 402; and (b) the State Historic Preservation Office, as required by section 106, National Historic Preservation Act, and the implementing regulations of the Advisory Council on Historic Preservation at 36 C.F.R. § 800.2.

l. With this notice, we are designating Essex as the Commission's non-federal representative for carrying out informal consultation, pursuant to section 7 of the Endangered Species Act and section 106 of the National Historic Preservation Act.

m. Essex filed with the Commission a Pre-Application Document (PAD), including a proposed process plan and schedule, pursuant to 18 C.F.R. § 5.6 of the Commission's regulations.

n. A copy of the PAD may be viewed on the Commission's website (http://www.ferc.gov) using the "eLibrary" link. Enter the docket number, excluding the last three digits in the docket number field, to access the document. For assistance, contact FERC at FERCOnlineSupport@ferc.gov or call toll-free, (866) 208-3676 or TYY, (202) 502-8659.

   You may register online at https://ferconline.ferc.gov/FERCOnline.aspx to be notified via email of new filings and issuances related to these or other pending projects. For assistance, contact FERC Online Support.

o. With this notice, we are soliciting comments on the PAD and Commission staff's Scoping Document 1 (SD1), as well as study requests. All comments on the PAD and SD1, and study requests should be sent to the address above in paragraph h. In addition, all comments on the PAD and SD1, study requests, requests for cooperating agency status, and all communications to and from staff related to the merits of the potential application must be filed with the Commission.

   The Commission strongly encourages electronic filing. Please file all documents using the Commission's eFiling system at https://ferconline.ferc.gov/FERC Online.aspx. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at https://ferconline. ferc.gov/QuickComment.aspx. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Support at FERCOnlineSupport@ferc.gov. In lieu of electronic filing, you may submit a paper copy. Submissions sent via the U.S. Postal Service must be addressed to: Kimberly D. Bose, Secretary, Federal Energy Regulatory

Commission, 888 First Street NE, Room 1A, Washington, DC 20426. Submissions sent via any other carrier must be addressed to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 12225 Wilkins Avenue, Rockville, Maryland 20852. The first page of any filing should include docket number **P-2800-054.**

All filings with the Commission must bear the appropriate heading: "Comments on Pre-Application Document," "Study Requests," "Comments on Scoping Document 1," "Request for Cooperating Agency Status," or "Communications to and from Commission Staff." Any individual or entity interested in submitting study requests, commenting on the PAD or SD1, and any agency requesting cooperating status must do so by **October 14, 2023.**[1]

p. The Commission's Office of Public Participation (OPP) supports meaningful public engagement and participation in Commission proceedings. OPP can help members of the public, including landowners, environmental justice communities, Tribal members and others, access publicly available information and navigate Commission processes. For public inquiries and assistance with making filings such as interventions, comments, or requests for rehearing, the public is encouraged to contact OPP at (202) 502-6595 or OPP@ferc.gov.

q. The Commission's scoping process will help determine the required level of analysis and satisfy the National Environmental Policy Act (NEPA) scoping requirements, irrespective of whether the Commission prepares an environmental assessment or environmental impact statement.

Scoping Meetings

Commission staff will hold two scoping meetings for the project to receive input on the scope of the NEPA document. An evening meeting will be held at 7:00 p.m. on September 13, 2023, at the Elk's Lodge #65 in Lawrence, Massachusetts, and will focus on receiving input from the public. A daytime meeting will be held at 10:00 a.m. on September 14, 2023, at Lawrence Public Library in Lawrence, Massachusetts, and will focus on the concerns of resource agencies, non-governmental organizations (NGOs), and Indian Tribes. We invite all interested agencies, Indian Tribes, non-governmental organizations, and

[1] The Commission's Rules of Practice and Procedure provide that if a filing deadline falls on a Saturday, Sunday, holiday, or other day when the Commission is closed for business, the filing deadline does not end until the close of business on the next business day. 18 C.F.R. § 385.2007(a)(2) (2022). Because the filing deadline falls on a Saturday (*i.e.*, September 2, 2023), the filing deadline is extended until the close of business on Monday, October 16, 2023.

individuals to attend one or both meetings. **Spanish-English translation services will be provided**. If a significant number of people are interested in providing oral comments, a time limit of 3 minutes may need to be implemented for each commentor.

The times and locations of these meetings are as follows:

Evening Scoping Meeting

DATE: Wednesday, September 13, 2023
TIME: 7:00 p.m. (EDT)
PLACE: Elks Lodge #65
ADDRESS: 652 Andover Street, Lawrence, MA 01843
PHONE: (978) 687-7274

Daytime Scoping Meeting

DATE: Thursday, September 14, 2023
TIME: 10:00 a.m. (EDT)
PLACE: Lawrence Public Library, Sargent Auditorium
ADDRESS: 51 Lawrence Street, Lawrence, MA 01841
PHONE: (978) 620-3600

SD1, which outlines the subject areas to be addressed in the environmental document, was mailed to the individuals and entities on the Commission's mailing list and Essex's distribution list. Copies of SD1 may be viewed on the web at http://www.ferc.gov, using the "eLibrary" link. Follow the directions for accessing information in paragraph n. Based on all oral and written comments, a Scoping Document 2 (SD2) may be issued. SD2 may include a revised process plan and schedule, as well as a list of issues, identified through the scoping process.

Environmental Site Review

The applicant and Commission staff will conduct an environmental site review of the project. All interested individuals, agencies, tribes, and NGOs are invited to attend. Please RSVP via email to Mkinney@patriothydro.com or notify Miley Kinney at (603) 732-8162 on or before September 5, 2023 if you plan to attend the environmental site review. The time and location of the environmental site review is as follows:

Lawrence Project

DATE: Wednesday, September 13, 2023

TIME: 9:00 a.m. (EDT)
PLACE: Lawrence Gateway parking lot
ADDRESS: 70 General Street, Lawrence, MA 01840

Participants will meet at the Lawrence Gateway parking lot and depart to the Lawrence at 9:15 a.m (EDT). Essex will provide transportation to the project facilities. All participants are responsible for their own transportation to the Lawrence Gateway parking lot.

All persons attending the environmental site review must wear sturdy, closed-toe shoes or boots. The applicant will provide hard hats to attendees for entry into low-overhead areas, if needed; however, participants who have their own hardhats should bring them.

Meeting Objectives

At the scoping meetings, Commission staff will: (1) initiate scoping of the issues; (2) review and discuss existing conditions; (3) review and discuss existing information and identify preliminary information and study needs; (4) review and discuss the process plan and schedule for pre-filing activity that incorporates the time frames provided for in Part 5 of the Commission's regulations and, to the extent possible, maximizes coordination of federal, state, and tribal permitting and certification processes; and (5) discuss the potential of any federal or state agency or Indian tribe to act as a cooperating agency for development of an environmental document.

Meeting participants should come prepared to discuss their issues and/or concerns. Please review the PAD in preparation for the scoping meetings. Directions on how to obtain a copy of the PAD and SD1 are included in item n of this document.

Meeting Procedures

Commission staff are moderating the scoping meetings. The meetings are recorded by an independent stenographer and become part of the formal record of the Commission proceeding on the project. Individuals, NGOs, Indian Tribes, and agencies with environmental expertise and concerns are encouraged to attend the meeting and to assist the staff in defining and clarifying the issues to be addressed in the NEPA document.

Kimberly D. Bose,
Secretary.

July 16, 2024

Brona Simon
Massachusetts Historical Commission
State Historic Preservation Officer
220 William T Morrissey Blvd
Boston, Massachusetts 02125

Subject: **Initiating Consultation and Requesting Concurrence on the Area of Potential Effects under Section 106 of the NHPA for the Lawrence Hydroelectric Project, FERC Project Number 2800; Essex County, Massachusetts.**

Dear Brona Simon:

Essex Company, LLC (Essex), a subsidiary of Patriot Hydro, LLC, is the Licensee, owner, and operator of the Lawrence Hydroelectric Project (FERC No. 2800) (Project or Lawrence Project). The Project was licensed by the Federal Energy Regulatory Commission (FERC or Commission) on December 4, 1978 (with an effective date of December 1, 1978), and the license expires on November 30, 2028. The Lawrence Project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts. Essex has initiated a licensing process for the Project with the Federal Energy Regulatory Commission (FERC). The issuance of a license by FERC to Essex is a federal undertaking subject to compliance with relevant federal historic preservation laws. In particular, as the lead federal agency for the undertaking, FERC must comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 300101 et seq.), which requires federal agencies to take into account the effects of their undertakings on historic properties.[1]

FERC issued a Notice of Notice of Intent (NOI) to File License Application and Filing of Pre-Application Document on August 15, 2023. This issuance designated Essex as the non-federal representative in accordance with Title 36 Code of Federal Regulations (CFR) Section 800.2(c)(4) for purposes of consultation under Section 106 of the NHPA (see Attachment 2).[2] On behalf of Essex under the authority of the FERC, HDR Engineering, Inc. (HDR) is seeking to initiate consultation with the Massachusetts State Historic Preservation Officer (SHPO) per 36 CFR Section 800.3 for the Project. In addition, in a

[1] "Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP] maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR Section 800.16(l)(1).

[2] FERC issued the Notice of Notice of Intent to File License Application and Filing of Pre-Application Document on August 15, 2023.

ccordance with 36 CFR 800.4(a)(1), we are requesting your concurrence on the appropriateness of the area of potential effects (APE) for the proposed undertaking.

Project Description

The Lawrence Hydroelectric Project is located along the Merrimack River in Lawrence, Massachusetts, and the Project consists of facilities including the Essex Dam, or the Great Stone Dam, the Project impoundment, intake canal, powerhouse, turbines and generators, the North Canal the South Canal and their respective gatehouses, tailrace, fish passage structures, transmission line, and recreational facilities. The Project is the first dam on the Merrimack River, approximately 29 river miles (RM) from the Atlantic Ocean and is located approximately 11 RM downstream of the Lowell Hydroelectric Project (FERC No. 2790).

FERC regulations require that a licensed hydroelectric project include a defined Project Boundary that includes "only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources." The Project Boundary encompasses approximately 1,092 acres.

Area of Potential Effects Description

Project operation and maintenance has the potential to affect historic properties. As defined in the applicable regulations found at 36 CFR 800.16(d), the APE is "...the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist." Because the Project Boundary encompasses all lands that are necessary for Project purposes, all Project-related operations, potential enhancement measures, and routine maintenance activities associated with the implementation of a license issued by the Commission are expected to take place within the Project Boundary. The proposed APE is consistent with the potential scope of Project effects and the manner in which the Commission has defined the APEs for other hydroelectric relicensings.

During the licensing process, Essex will conduct a Historically Significant Waterpower Equipment Study in accordance with the *Historically Significant Waterpower Equipment Study Plan, Lawrence Hydroelectric Project (FERC No. 2800)* (Revised Study Plan), dated April 10, 2024.

Because it is not possible to determine all of the effects of various activities that may occur over the course of a license, Essex plans to develop a Historic Properties Management Plan (HPMP) in consultation with consulting parties to manage potential effects on historic properties throughout the term of a license issued by FERC. FERC typically completes Section 106 by entering into a Programmatic Agreement (PA) or Memorandum of

Agreement (MOA) with the licensee, the Advisory Council on Historic Preservation (ACHP), if they choose to participate, and the SHPO that requires the licensee to develop and implement an HPMP in consultation with Section 106 consulting parties.

Essex will prepare a report at the conclusion of the Historically Significant Waterpower Equipment Study that will contain sensitive, confidential, and privileged information and will work with FERC, SHPO, and tribes to ensure that confidential information is shared with consulting parties appropriately. Essex will seek SHPO concurrence on any NRHP eligibility determinations. The study report may be filed with FERC with a designation as "privileged." Essex will also provide a summary of findings for purposes of the public licensing process that excludes sensitive, confidential, and privileged information.

In accordance with 36 CFR 800.4(a)(1), Essex requests your concurrence on the appropriateness of the APE for the proposed undertaking. Pursuant to 36 CFR 800.4, we look forward to receiving your response within 30 days of your receipt of this submittal given field work associated with the Historically Significant Waterpower Equipment Study is scheduled to begin in this fall of 2024 (mid-September to October).

If you have any questions or require additional information regarding the attachments or any other aspect of this transmittal, please do not hesitate to contact me at (717) 515-8994 or Kimberly.smith@hdrinc.com. Thank you for your assistance with this undertaking.

Respectfully submitted,

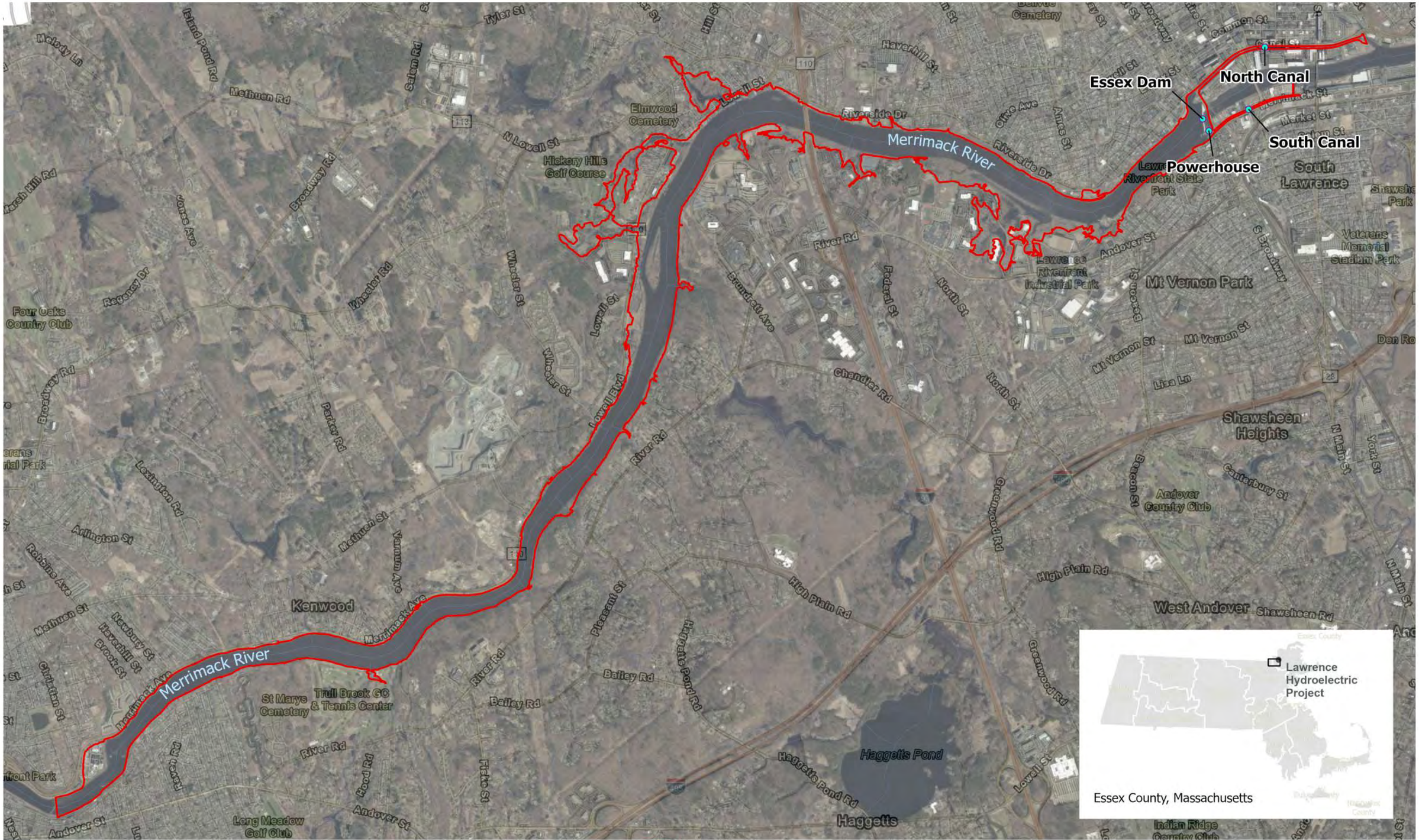
Kimberly Smith, MA, RPA
Senior Cultural Resources Specialist
HDR

cc:

Attachments: 1) Project Boundary Map
2) FERC Notice of Intent to File License Application, Filing of Pre-Application Document

Attachment 1

Project Boundary Map



AREA OF INTEREST
ESSEX DAM AND FACILITIES

\\SYR-SRV01\GIS\PROJECTS\CENTRAL_RIVERS_POWER\10358652_LAWRENCERELICENSING\7.2_WIP\MAP_DOCS\CRP_LAWRENCEPROJECT1.APRX DATE: 6/14/2023

LAWRENCE HYDROELECTRIC PROJECT

PROJECT FACILITIES
ESSEX COUNTY, MASSACHUSETTS

\\SYR-SRV01\GIS\PROJECTS\CENTRAL_RIVERS_POWER\10358652_LAWRENCERELICENSING\7.2_WIP\MAP_DOCS\CRP_LAWRENCEPROJECT1.APRX DATE: 6/14/2023

LAWRENCE HYDROELECTRIC PROJECT

Initiating Consultation and Requesting Concurrence on the APE under Section 106 of the NHPA for the Lawrence Hydroelectric Project, FERC Project Number 2800; Essex County, Massachusetts.

Attachment 2

FERC NOI and designation of Essex as non-federal representative for purposes of Section 106 consultation during licensing

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Essex Company, LLC Project No. 2800-054

NOTICE OF INTENT TO FILE LICENSE APPLICATION, FILING OF PRE-APPLICATION DOCUMENT (PAD), COMMENCEMENT OF PRE-FILING PROCESS, AND SCOPING; REQUEST FOR COMMENTS ON THE PAD AND SCOPING DOCUMENT, AND IDENTIFICATION OF ISSUES AND ASSOCIATED STUDY REQUESTS

(August 15, 2023)

a. Type of Filing: Notice of Intent to File License Application for a New License and Commencing Pre-filing Process

b. Project No.: 2800-054

c. Dated Filed: June 16, 2023

d. Submitted By: Essex Company, LLC (Essex)

e. Name of Project: Lawrence Hydroelectric Project (Lawrence Project)

f. Location: The project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts.

g. Filed Pursuant to: 18 C.F.R. Part 5 of the Commission's Regulations

h. Applicant Contact: Kevin Webb, Hydro Licensing Manager, Essex Company, 670 N. Commercial Street, Suite 204, Manchester, NH 03101; (978) 935-6039; kwebb@patriothydro.com.

i. FERC Contact: Bill Connelly at (202) 502-8587 or e-mail at william.connelly@ferc.gov.

j. Cooperating agencies: Federal, state, local, and tribal agencies with jurisdiction and/or special expertise with respect to environmental issues that wish to cooperate in the preparation of the environmental document should follow the instructions for filing such requests described in item o below. Cooperating agencies should note the Commission's policy that agencies that cooperate in the preparation of the environmental document cannot also intervene. *See* 94 FERC ¶ 61,076 (2001).

k. With this notice, we are initiating informal consultation with: (a) the U.S. Fish and Wildlife Service and/or the National Oceanic and Atmospheric Administration Fisheries under section 7 of the Endangered Species Act and the joint agency regulations thereunder at 50 C.F.R., Part 402; and (b) the State Historic Preservation Office, as required by section 106, National Historic Preservation Act, and the implementing regulations of the Advisory Council on Historic Preservation at 36 C.F.R. § 800.2.

l. With this notice, we are designating Essex as the Commission's non-federal representative for carrying out informal consultation, pursuant to section 7 of the Endangered Species Act and section 106 of the National Historic Preservation Act.

m. Essex filed with the Commission a Pre-Application Document (PAD), including a proposed process plan and schedule, pursuant to 18 C.F.R. § 5.6 of the Commission's regulations.

n. A copy of the PAD may be viewed on the Commission's website (http://www.ferc.gov) using the "eLibrary" link. Enter the docket number, excluding the last three digits in the docket number field, to access the document. For assistance, contact FERC at FERCOnlineSupport@ferc.gov or call toll-free, (866) 208-3676 or TYY, (202) 502-8659.

   You may register online at https://ferconline.ferc.gov/FERCOnline.aspx to be notified via email of new filings and issuances related to these or other pending projects. For assistance, contact FERC Online Support.

o. With this notice, we are soliciting comments on the PAD and Commission staff's Scoping Document 1 (SD1), as well as study requests. All comments on the PAD and SD1, and study requests should be sent to the address above in paragraph h. In addition, all comments on the PAD and SD1, study requests, requests for cooperating agency status, and all communications to and from staff related to the merits of the potential application must be filed with the Commission.

   The Commission strongly encourages electronic filing. Please file all documents using the Commission's eFiling system at https://ferconline.ferc.gov/FERC Online.aspx. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at https://ferconline. ferc.gov/QuickComment.aspx. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Support at FERCOnlineSupport@ferc.gov. In lieu of electronic filing, you may submit a paper copy. Submissions sent via the U.S. Postal Service must be addressed to: Kimberly D. Bose, Secretary, Federal Energy Regulatory

Commission, 888 First Street NE, Room 1A, Washington, DC 20426. Submissions sent via any other carrier must be addressed to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 12225 Wilkins Avenue, Rockville, Maryland 20852. The first page of any filing should include docket number **P-2800-054.**

All filings with the Commission must bear the appropriate heading: "Comments on Pre-Application Document," "Study Requests," "Comments on Scoping Document 1," "Request for Cooperating Agency Status," or "Communications to and from Commission Staff." Any individual or entity interested in submitting study requests, commenting on the PAD or SD1, and any agency requesting cooperating status must do so by **October 14, 2023.**[1]

p. The Commission's Office of Public Participation (OPP) supports meaningful public engagement and participation in Commission proceedings. OPP can help members of the public, including landowners, environmental justice communities, Tribal members and others, access publicly available information and navigate Commission processes. For public inquiries and assistance with making filings such as interventions, comments, or requests for rehearing, the public is encouraged to contact OPP at (202) 502-6595 or OPP@ferc.gov.

q. The Commission's scoping process will help determine the required level of analysis and satisfy the National Environmental Policy Act (NEPA) scoping requirements, irrespective of whether the Commission prepares an environmental assessment or environmental impact statement.

Scoping Meetings

Commission staff will hold two scoping meetings for the project to receive input on the scope of the NEPA document. An evening meeting will be held at 7:00 p.m. on September 13, 2023, at the Elk's Lodge #65 in Lawrence, Massachusetts, and will focus on receiving input from the public. A daytime meeting will be held at 10:00 a.m. on September 14, 2023, at Lawrence Public Library in Lawrence, Massachusetts, and will focus on the concerns of resource agencies, non-governmental organizations (NGOs), and Indian Tribes. We invite all interested agencies, Indian Tribes, non-governmental organizations, and

[1] The Commission's Rules of Practice and Procedure provide that if a filing deadline falls on a Saturday, Sunday, holiday, or other day when the Commission is closed for business, the filing deadline does not end until the close of business on the next business day. 18 C.F.R. § 385.2007(a)(2) (2022). Because the filing deadline falls on a Saturday (*i.e.*, September 2, 2023), the filing deadline is extended until the close of business on Monday, October 16, 2023.

individuals to attend one or both meetings. **Spanish-English translation services will be provided**. If a significant number of people are interested in providing oral comments, a time limit of 3 minutes may need to be implemented for each commentor.

The times and locations of these meetings are as follows:

Evening Scoping Meeting

DATE: Wednesday, September 13, 2023
TIME: 7:00 p.m. (EDT)
PLACE: Elks Lodge #65
ADDRESS: 652 Andover Street, Lawrence, MA 01843
PHONE: (978) 687-7274

Daytime Scoping Meeting

DATE: Thursday, September 14, 2023
TIME: 10:00 a.m. (EDT)
PLACE: Lawrence Public Library, Sargent Auditorium
ADDRESS: 51 Lawrence Street, Lawrence, MA 01841
PHONE: (978) 620-3600

SD1, which outlines the subject areas to be addressed in the environmental document, was mailed to the individuals and entities on the Commission's mailing list and Essex's distribution list. Copies of SD1 may be viewed on the web at http://www.ferc.gov, using the "eLibrary" link. Follow the directions for accessing information in paragraph n. Based on all oral and written comments, a Scoping Document 2 (SD2) may be issued. SD2 may include a revised process plan and schedule, as well as a list of issues, identified through the scoping process.

Environmental Site Review

The applicant and Commission staff will conduct an environmental site review of the project. All interested individuals, agencies, tribes, and NGOs are invited to attend. Please RSVP via email to Mkinney@patriothydro.com or notify Miley Kinney at (603) 732-8162 on or before September 5, 2023 if you plan to attend the environmental site review. The time and location of the environmental site review is as follows:

Lawrence Project

DATE: Wednesday, September 13, 2023

TIME: 9:00 a.m. (EDT)
PLACE: Lawrence Gateway parking lot
ADDRESS: 70 General Street, Lawrence, MA 01840

Participants will meet at the Lawrence Gateway parking lot and depart to the Lawrence at 9:15 a.m (EDT). Essex will provide transportation to the project facilities. All participants are responsible for their own transportation to the Lawrence Gateway parking lot.

All persons attending the environmental site review must wear sturdy, closed-toe shoes or boots. The applicant will provide hard hats to attendees for entry into low-overhead areas, if needed; however, participants who have their own hardhats should bring them.

Meeting Objectives

At the scoping meetings, Commission staff will: (1) initiate scoping of the issues; (2) review and discuss existing conditions; (3) review and discuss existing information and identify preliminary information and study needs; (4) review and discuss the process plan and schedule for pre-filing activity that incorporates the time frames provided for in Part 5 of the Commission's regulations and, to the extent possible, maximizes coordination of federal, state, and tribal permitting and certification processes; and (5) discuss the potential of any federal or state agency or Indian tribe to act as a cooperating agency for development of an environmental document.

Meeting participants should come prepared to discuss their issues and/or concerns. Please review the PAD in preparation for the scoping meetings. Directions on how to obtain a copy of the PAD and SD1 are included in item n of this document.

Meeting Procedures

Commission staff are moderating the scoping meetings. The meetings are recorded by an independent stenographer and become part of the formal record of the Commission proceeding on the project. Individuals, NGOs, Indian Tribes, and agencies with environmental expertise and concerns are encouraged to attend the meeting and to assist the staff in defining and clarifying the issues to be addressed in the NEPA document.

Kimberly D. Bose,
Secretary.

July 16, 2024

Jonas Stundžia
Chairman
Lawrence Historical Commission
200 Common Street
3rd Floor
Lawrence, MA 01840

Subject: **Initiating Consultation and Requesting Concurrence on the Area of Potential Effects for the Lawrence Hydroelectric Project, FERC Project Number 2800; Essex County, Massachusetts.**

Dear Jonas Stundžia:

Essex Company, LLC (Essex), a subsidiary of Patriot Hydro, LLC, is the Licensee, owner, and operator of the Lawrence Hydroelectric Project (FERC No. 2800) (Project or Lawrence Project). The Project was licensed by the Federal Energy Regulatory Commission (FERC or Commission) on December 4, 1978 (with an effective date of December 1, 1978), and the license expires on November 30, 2028. The Lawrence Project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts. Essex has initiated a licensing process for the Project with the Federal Energy Regulatory Commission (FERC). The issuance of a license by FERC to Essex is a federal undertaking subject to compliance with relevant federal historic preservation laws. In particular, as the lead federal agency for the undertaking, FERC must comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 300101 et seq.), which requires federal agencies to take into account the effects of their undertakings on historic properties.[1]

FERC issued a Notice of Notice of Intent (NOI) to File License Application and Filing of Pre-Application Document on August 15, 2023. This issuance designated Essex as the non-federal representative in accordance with Title 36 Code of Federal Regulations (CFR) Section 800.2(c)(4) for purposes of consultation under Section 106 of the NHPA (see Attachment 2).[2] On behalf of Essex under the authority of the FERC, HDR Engineering, Inc. (HDR) initiated consultation with the Massachusetts State Historic Preservation Officer (SHPO) per 36 CFR Section 800.3 for the Project and in accordance with 36 CFR

[1] "Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP] maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR Section 800.16(l)(1).
[2] FERC issued the Notice of Notice of Intent to File License Application and Filing of Pre-Application Document on August 15, 2023.

800.4(a)(1), requested concurrence on the appropriateness of the area of potential effects (APE) for the proposed undertaking. Additionally, Essex is seeking your concurrence with with the APE for the proposed undertaking.

Project Description

The Lawrence Hydroelectric Project is located along the Merrimack River in Lawrence, Massachusetts, and the Project consists of facilities including the Essex Dam, or the Great Stone Dam, the Project impoundment, intake canal, powerhouse, turbines and generators, the North Canal the South Canal and their respective gatehouses, tailrace, fish passage structures, transmission line, and recreational facilities. The Project is the first dam on the Merrimack River, approximately 29 river miles (RM) from the Atlantic Ocean and is located approximately 11 RM downstream of the Lowell Hydroelectric Project (FERC No. 2790).

FERC regulations require that a licensed hydroelectric project include a defined Project Boundary that includes "only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources." The Project Boundary encompasses approximately 1,092 acres.

Area of Potential Effects Description

Project operation and maintenance has the potential to affect historic properties. As defined in the applicable regulations found at 36 CFR 800.16(d), the APE is "...the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist." Because the Project Boundary encompasses all lands that are necessary for Project purposes, all Project-related operations, potential enhancement measures, and routine maintenance activities associated with the implementation of a license issued by the Commission are expected to take place within the Project Boundary. The proposed APE is consistent with the potential scope of Project effects and the manner in which the Commission has defined the APEs for other hydroelectric relicensings.

During the licensing process, Essex will conduct a Historically Significant Waterpower Equipment Study in accordance with the *Historically Significant Waterpower Equipment Study Plan, Lawrence Hydroelectric Project (FERC No. 2800)* (Revised Study Plan), dated April 10, 2024.

Because it is not possible to determine all of the effects of various activities that may occur over the course of a license, Essex plans to develop a Historic Properties Management Plan (HPMP) in consultation with consulting parties to manage potential effects on historic properties throughout the term of a license issued by FERC. FERC typically completes

Section 106 by entering into a Programmatic Agreement (PA) or Memorandum of Agreement (MOA) with the licensee, the Advisory Council on Historic Preservation (ACHP), if they choose to participate, and the SHPO that requires the licensee to develop and implement an HPMP in consultation with Section 106 consulting parties.

Essex will prepare a report at the conclusion of the Historically Significant Waterpower Equipment Study that will contain sensitive, confidential, and privileged information and will work with FERC, SHPO, and tribes to ensure that confidential information is shared with consulting parties appropriately. Essex will seek SHPO concurrence on any NRHP eligibility determinations. The study report may be filed with FERC with a designation as "privileged." Essex will also provide a summary of findings for purposes of the public licensing process that excludes sensitive, confidential, and privileged information.

Essex requests your concurrence on the appropriateness of the APE for the proposed undertaking. We look forward to receiving your response within 30 days of your receipt of this submittal given field work associated with the Historically Significant Waterpower Equipment Study is scheduled to begin in this fall of 2024 (mid-September to October).

If you have any questions or require additional information regarding the attachments or any other aspect of this transmittal, please do not hesitate to contact me at (717) 515-8994 or Kimberly.smith@hdrinc.com. Thank you for your assistance with this undertaking.

Respectfully submitted,

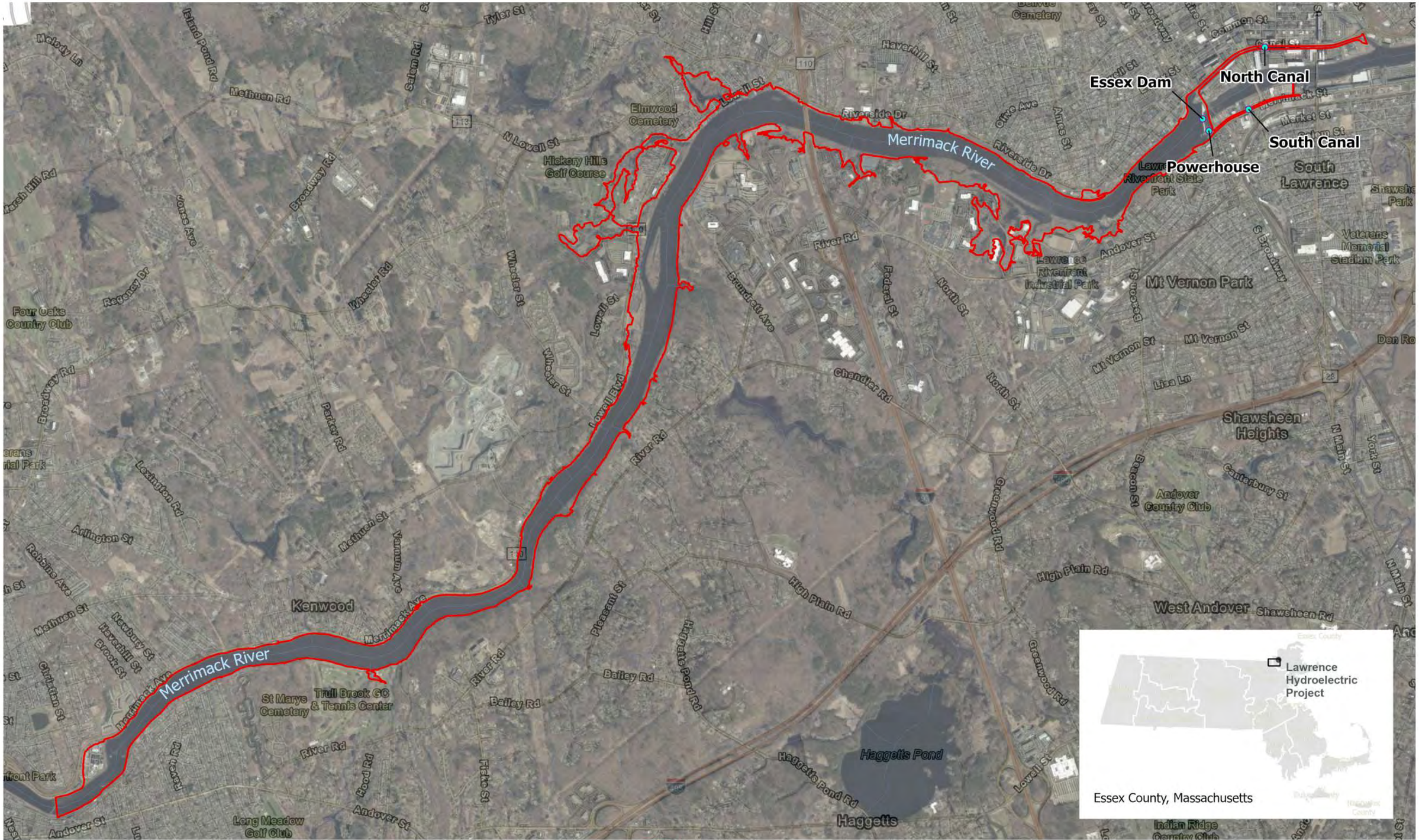
Kimberly Smith, MA, RPA
Senior Cultural Resources Specialist
HDR

cc:

Attachments: 1) Project Boundary Map
2) FERC Notice of Intent to File License Application, Filing of Pre-Application Document

Attachment 1

Project Boundary Map



AREA OF INTEREST
ESSEX DAM AND FACILITIES

\\SYR-SRV01\GIS\PROJECTS\CENTRAL_RIVERS_POWER\10358652_LAWRENCERELICENSING\7.2_WIP\MAP_DOCS\CRP_LAWRENCEPROJECT1.APRX DATE: 6/14/2023

LAWRENCE HYDROELECTRIC PROJECT

PROJECT FACILITIES
ESSEX COUNTY, MASSACHUSETTS

\\SYR-SRV01\GIS\PROJECTS\CENTRAL_RIVERS_POWER\10358652_LAWRENCERELICENSING\7.2_WIP\MAP_DOCS\CRP_LAWRENCEPROJECT1.APRX DATE: 6/14/2023

LAWRENCE HYDROELECTRIC PROJECT

Initiating Consultation and Requesting Concurrence on the APE for the Lawrence Hydroelectric Project, FERC Project Number 2800; Essex County, Massachusetts.

Attachment 2

FERC NOI and designation of Essex as non-federal representative for purposes of Section 106 consultation during licensing

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Essex Company, LLC Project No. 2800-054

NOTICE OF INTENT TO FILE LICENSE APPLICATION, FILING OF PRE-APPLICATION DOCUMENT (PAD), COMMENCEMENT OF PRE-FILING PROCESS, AND SCOPING; REQUEST FOR COMMENTS ON THE PAD AND SCOPING DOCUMENT, AND IDENTIFICATION OF ISSUES AND ASSOCIATED STUDY REQUESTS

(August 15, 2023)

a. Type of Filing: Notice of Intent to File License Application for a New License and Commencing Pre-filing Process

b. Project No.: 2800-054

c. Dated Filed: June 16, 2023

d. Submitted By: Essex Company, LLC (Essex)

e. Name of Project: Lawrence Hydroelectric Project (Lawrence Project)

f. Location: The project is located on the Merrimack River in the City of Lawrence in Essex County, Massachusetts.

g. Filed Pursuant to: 18 C.F.R. Part 5 of the Commission's Regulations

h. Applicant Contact: Kevin Webb, Hydro Licensing Manager, Essex Company, 670 N. Commercial Street, Suite 204, Manchester, NH 03101; (978) 935-6039; kwebb@patriothydro.com.

i. FERC Contact: Bill Connelly at (202) 502-8587 or e-mail at william.connelly@ferc.gov.

j. Cooperating agencies: Federal, state, local, and tribal agencies with jurisdiction and/or special expertise with respect to environmental issues that wish to cooperate in the preparation of the environmental document should follow the instructions for filing such requests described in item o below. Cooperating agencies should note the Commission's policy that agencies that cooperate in the preparation of the environmental document cannot also intervene. *See* 94 FERC ¶ 61,076 (2001).

k. With this notice, we are initiating informal consultation with: (a) the U.S. Fish and Wildlife Service and/or the National Oceanic and Atmospheric Administration Fisheries under section 7 of the Endangered Species Act and the joint agency regulations thereunder at 50 C.F.R., Part 402; and (b) the State Historic Preservation Office, as required by section 106, National Historic Preservation Act, and the implementing regulations of the Advisory Council on Historic Preservation at 36 C.F.R. § 800.2.

l. With this notice, we are designating Essex as the Commission's non-federal representative for carrying out informal consultation, pursuant to section 7 of the Endangered Species Act and section 106 of the National Historic Preservation Act.

m. Essex filed with the Commission a Pre-Application Document (PAD), including a proposed process plan and schedule, pursuant to 18 C.F.R. § 5.6 of the Commission's regulations.

n. A copy of the PAD may be viewed on the Commission's website (http://www.ferc.gov) using the "eLibrary" link. Enter the docket number, excluding the last three digits in the docket number field, to access the document. For assistance, contact FERC at FERCOnlineSupport@ferc.gov or call toll-free, (866) 208-3676 or TYY, (202) 502-8659.

   You may register online at https://ferconline.ferc.gov/FERCOnline.aspx to be notified via email of new filings and issuances related to these or other pending projects. For assistance, contact FERC Online Support.

o. With this notice, we are soliciting comments on the PAD and Commission staff's Scoping Document 1 (SD1), as well as study requests. All comments on the PAD and SD1, and study requests should be sent to the address above in paragraph h. In addition, all comments on the PAD and SD1, study requests, requests for cooperating agency status, and all communications to and from staff related to the merits of the potential application must be filed with the Commission.

   The Commission strongly encourages electronic filing. Please file all documents using the Commission's eFiling system at https://ferconline.ferc.gov/FERC Online.aspx. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at https://ferconline. ferc.gov/QuickComment.aspx. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Support at FERCOnlineSupport@ferc.gov. In lieu of electronic filing, you may submit a paper copy. Submissions sent via the U.S. Postal Service must be addressed to: Kimberly D. Bose, Secretary, Federal Energy Regulatory

Commission, 888 First Street NE, Room 1A, Washington, DC 20426. Submissions sent via any other carrier must be addressed to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 12225 Wilkins Avenue, Rockville, Maryland 20852. The first page of any filing should include docket number **P-2800-054.**

All filings with the Commission must bear the appropriate heading: "Comments on Pre-Application Document," "Study Requests," "Comments on Scoping Document 1," "Request for Cooperating Agency Status," or "Communications to and from Commission Staff." Any individual or entity interested in submitting study requests, commenting on the PAD or SD1, and any agency requesting cooperating status must do so by **October 14, 2023.**[1]

p. The Commission's Office of Public Participation (OPP) supports meaningful public engagement and participation in Commission proceedings. OPP can help members of the public, including landowners, environmental justice communities, Tribal members and others, access publicly available information and navigate Commission processes. For public inquiries and assistance with making filings such as interventions, comments, or requests for rehearing, the public is encouraged to contact OPP at (202) 502-6595 or OPP@ferc.gov.

q. The Commission's scoping process will help determine the required level of analysis and satisfy the National Environmental Policy Act (NEPA) scoping requirements, irrespective of whether the Commission prepares an environmental assessment or environmental impact statement.

Scoping Meetings

Commission staff will hold two scoping meetings for the project to receive input on the scope of the NEPA document. An evening meeting will be held at 7:00 p.m. on September 13, 2023, at the Elk's Lodge #65 in Lawrence, Massachusetts, and will focus on receiving input from the public. A daytime meeting will be held at 10:00 a.m. on September 14, 2023, at Lawrence Public Library in Lawrence, Massachusetts, and will focus on the concerns of resource agencies, non-governmental organizations (NGOs), and Indian Tribes. We invite all interested agencies, Indian Tribes, non-governmental organizations, and

[1] The Commission's Rules of Practice and Procedure provide that if a filing deadline falls on a Saturday, Sunday, holiday, or other day when the Commission is closed for business, the filing deadline does not end until the close of business on the next business day. 18 C.F.R. § 385.2007(a)(2) (2022). Because the filing deadline falls on a Saturday (*i.e.*, September 2, 2023), the filing deadline is extended until the close of business on Monday, October 16, 2023.

individuals to attend one or both meetings. **Spanish-English translation services will be provided**. If a significant number of people are interested in providing oral comments, a time limit of 3 minutes may need to be implemented for each commentor.

The times and locations of these meetings are as follows:

Evening Scoping Meeting

DATE: Wednesday, September 13, 2023
TIME: 7:00 p.m. (EDT)
PLACE: Elks Lodge #65
ADDRESS: 652 Andover Street, Lawrence, MA 01843
PHONE: (978) 687-7274

Daytime Scoping Meeting

DATE: Thursday, September 14, 2023
TIME: 10:00 a.m. (EDT)
PLACE: Lawrence Public Library, Sargent Auditorium
ADDRESS: 51 Lawrence Street, Lawrence, MA 01841
PHONE: (978) 620-3600

SD1, which outlines the subject areas to be addressed in the environmental document, was mailed to the individuals and entities on the Commission's mailing list and Essex's distribution list. Copies of SD1 may be viewed on the web at http://www.ferc.gov, using the "eLibrary" link. Follow the directions for accessing information in paragraph n. Based on all oral and written comments, a Scoping Document 2 (SD2) may be issued. SD2 may include a revised process plan and schedule, as well as a list of issues, identified through the scoping process.

Environmental Site Review

The applicant and Commission staff will conduct an environmental site review of the project. All interested individuals, agencies, tribes, and NGOs are invited to attend. Please RSVP via email to Mkinney@patriothydro.com or notify Miley Kinney at (603) 732-8162 on or before September 5, 2023 if you plan to attend the environmental site review. The time and location of the environmental site review is as follows:

Lawrence Project

DATE: Wednesday, September 13, 2023

TIME: 9:00 a.m. (EDT)
PLACE: Lawrence Gateway parking lot
ADDRESS: 70 General Street, Lawrence, MA 01840

Participants will meet at the Lawrence Gateway parking lot and depart to the Lawrence at 9:15 a.m (EDT). Essex will provide transportation to the project facilities. All participants are responsible for their own transportation to the Lawrence Gateway parking lot.

All persons attending the environmental site review must wear sturdy, closed-toe shoes or boots. The applicant will provide hard hats to attendees for entry into low-overhead areas, if needed; however, participants who have their own hardhats should bring them.

Meeting Objectives

At the scoping meetings, Commission staff will: (1) initiate scoping of the issues; (2) review and discuss existing conditions; (3) review and discuss existing information and identify preliminary information and study needs; (4) review and discuss the process plan and schedule for pre-filing activity that incorporates the time frames provided for in Part 5 of the Commission's regulations and, to the extent possible, maximizes coordination of federal, state, and tribal permitting and certification processes; and (5) discuss the potential of any federal or state agency or Indian tribe to act as a cooperating agency for development of an environmental document.

Meeting participants should come prepared to discuss their issues and/or concerns. Please review the PAD in preparation for the scoping meetings. Directions on how to obtain a copy of the PAD and SD1 are included in item n of this document.

Meeting Procedures

Commission staff are moderating the scoping meetings. The meetings are recorded by an independent stenographer and become part of the formal record of the Commission proceeding on the project. Individuals, NGOs, Indian Tribes, and agencies with environmental expertise and concerns are encouraged to attend the meeting and to assist the staff in defining and clarifying the issues to be addressed in the NEPA document.

Kimberly D. Bose,
Secretary.